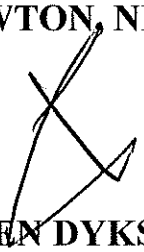
STORMWATER MANAGEMENT REPORT

FOR
SEEGULL, LLC
TAX LOT 4.01, BLOCK 108
ANDOVER TOWNSHIP
SUSSEX COUNTY
NEW JERSEY

DATED: October 17, 2023

PREPARED BY:
DYKSTRA ASSOCIATES, PC
11 LAWRENCE ROAD
NEWTON, NEW JERSEY 07860



OWEN DYKSTRA,
P.E. N.J. LIC. No.: 39920

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Dykstra Associates, PC

INTRODUCTION

The site is located at street address 1023 Limecrest Road in Andover Township. The lot frontage is adjacent to Sussex County Right-of -Way. The lot contains paved and gravel areas, an existing dual-purpose office and garage building, two partially enclosed garage buildings, a septic system, a well, and other equipment associated with operation of a mulch plant. The project proposes demolition of existing improvements and construction of a ready-mix concrete facility with all associated improvements. Proposed improvements include the following: an office and maintenance building, a concrete plant, a concrete wash water settling basin, paved drives, sidewalks, septic, well, and stormwater infrastructure.

This report is prepared to address Stormwater Management Ordinance in the Land Management Code of Andover Township.

APPLICABILITY

The proposed redevelopment is subject to the Stormwater Control Ordinance as it is defined as a Major Development disturbing more than 1 acre.

GENERAL STANDARDS

The project will require conformance with the water quality, water quantity and groundwater recharge requirements of the Stormwater Ordinance.

In order to demonstrate compliance with the requirements a TR55 Model of the pre-developed and post-developed conditions has been prepared and the associated hydrographs are incorporated in Appendix A of this report.

PRE-DEVELOPED CONDITION:

The existing condition is one lot with a total acreage of 3.67 acres. The area currently drains to three different areas offsite, one to the south-west, one to the north-west, and one to the north-east. The entire area to be disturbed is comprised of Type RnfC (Rock outcrop-FarmingtonGalway complex). For modeling purposes, the pervious ground cover was taken as open space in good condition or woods in good condition depending on the location on site.

The impervious and non-impervious portions of each basin have been modeled separately as required. The Time of Concentrations utilized in the report were calculated using the velocity method. For Basin B, the minimum time of concentration was used due to the limited size of drainage basin and very short flow paths.

The hydrographs are presented in Appendix A of this report. The pre-developed drainage basin has been modeled to determine the pre-developed discharge rates as follows:

Pre-Developed Basin A:
Pre-developed Basin A contains the area which drains offsite to the south-west. This area is modeled as follows:

Pervious Area: (Hydrograph 1)
TC = 12 Minutes
0.45 Acres Pervious @ CN = 70 (weighted CN for mix of woods and open space)
Impervious Area: (Hydrograph 2)
TC = 12 Minutes
2.33 Acres Impervious @ CN = 98

Total Pre-developed Basin A Peak Discharge (Hydrograph 3):
Q2 = 7.09 CFS
Q10 = 10.61 CFS
Q100 = 16.63 CFS

Pre-Developed Basin B:
Pre-developed Basin B contains the area which drains offsite to the north-west. This area is 100% impervious and is modeled as follows:

Impervious Area: (Hydrograph 4)
TC = 6 Minutes (Minimum Value)
0.61 Acres Impervious @ CN = 98

Total Pre-developed Basin B Peak Discharge (Hydrograph 4):
Q2 = 2.06 CFS
Q10 = 2.99 CFS
Q100 = 4.54 CFS

Pre-Developed Basin C:
Pre-developed Basin C contains the area which drains offsite to the north-east. This area is modeled as follows:

Pervious Area: (Hydrograph 5)
TC = 10.25 Minutes
0.25 Acres Pervious @ CN = 74 (Open Space, good condition)
Impervious Area: (Hydrograph 6)
TC = 10.25 Minutes
0.83 Acres Impervious @ CN = 98

Total Pre-developed Basin A Peak Discharge (Hydrograph 7):
Q2 = 2.67 CFS
Q10 = 4.04 CFS
Q100 = 6.40 CFS

POST-DEVELOPED CONDITION:

The project is to remove existing buildings and coverage and install new buildings, drives, and other improvements associated with the proposed use. One new drainage system is proposed.

The hydrographs are presented in Appendix A of this report. The post-developed drainage basin has been modeled as follows:

Post-Developed Basin A

This Post-developed Basin A contains the portion of the site that drains to the south-west. Portions of this basin that bypass the proposed drainage system are modeled in hydrographs 8 and 9. Portions that drain to the proposed system are modeled in hydrographs 10 and 11 and routed through the proposed infiltration basins in hydrograph 13.

Pervious Area: (Hydrograph 8)
TC = 12.3 Minutes
0.49 Acres Pervious @ CN = 71 (weighted CN for mix of woods and open space)
Impervious Area: (Hydrograph 9)
TC = 12.3 Minutes
0.59 Acres Impervious @ CN = 98

Pervious Area: (Hydrograph 10)
TC = 12.3 Minutes
0.54 Acres Pervious @ CN = 74 (Open Space, good condition)
Impervious Area: (Hydrograph 11)
TC = 12.3 Minutes
1.36 Acres Impervious @ CN = 98

Post Developed Basin A Peak Discharge (Hydrograph 14):
Q2 = 2.14 CFS
Q10 = 6.59 CFS
Q100 = 15.61 CFS

Post-Developed Basin B:

This Post-developed Basin B flows offsite to the north-west. This area is modeled as follows:

Pervious Area: (Hydrograph 15)
TC = 6 Minutes (Minimum Value)
0.08 Acres Pervious @ CN = 74 (Open Space, good condition)
Impervious Area: (Hydrograph 16)
TC = 6 Minutes
0.46 Acres Impervious @ CN = 98

Post Developed Basin B Peak Discharge: (Hydrograph 17)
Q2 = 1.66 CFS
Q10 = 2.47 CFS
Q100 = 3.85 CFS

Post-Developed Basin C:

This Post-developed Basin C flows offsite to the north-east. This area is modeled as follows:

Pervious Area: (Hydrograph 18)
TC = 12 Minutes
0.50 Acres Pervious @ CN = 74 (Open Space, good condition)
Impervious Area: (Hydrograph 19)
TC = 12 Minutes
0.40 Acres Impervious @ CN = 98

Total Post Developed Basin B Peak Discharge (Hydrograph 20):
Q2 = 1.71 CFS
Q10 = 2.82 CFS
Q100 = 4.78 CFS

STORMWATER MANAGEMENT COMPLIANCE:

WATER QUANTITY STANDARDS:

Requirement: Demonstrate through hydrologic and hydraulic analysis that there is no increase, as compared to the pre-construction condition, in the peak runoff rates of stormwater leaving the site for the two-, 10-, and 100-year storm events and that the increased volume or change in timing of stormwater runoff will not increase flood damage at or downstream of the site.

In order to address this the pre and post developed hydrographs have been compared as follows for each stormwater basin:

Comparison of Peak Discharge Rates: Basin A:

AREA	2 YEAR STORM	10 YEAR STORM	100 YEAR STORM
PRE-DEVELOPED (CFS)	7.1	10.6	16.6
POST-DEVELOPED (CFS)	2.1	6.6	15.6
PERCENT CHANGE	-69.89%	-37.87%	-6.13%

Comparison of Volume Discharging: Basin A:

AREA	2 YEAR STORM	10 YEAR STORM	100 YEAR STORM
PRE-DEVELOPED (CF)	27,955	42,192	66,583
POST-DEVELOPED (CF)	8,532	19,380	39,786
PERCENT CHANGE	-69.48%	-54.07%	-40.25%

In Basin A the peak discharge has been reduced for each of the requisite stormwater events. In addition, the volumes leaving the sub basin for each of the storm events has been reduced. Together with a review of the timing of the hydrographs, this demonstrates that the proposed site changes will not increase flood damage at or downstream of the site.

Comparison of Peak Discharge Rates: Basin B:

AREA	2 YEAR STORM	10 YEAR STORM	100 YEAR STORM
PRE-DEVELOPED (CFS)	2.1	3.0	4.5
POST-DEVELOPED (CFS)	1.7	2.5	3.9
PERCENT CHANGE	-19.29%	-17.23%	-15.21%

Comparison of Volume Discharging: Basin B:

AREA	2 YEAR STORM	10 YEAR STORM	100 YEAR STORM
PRE-DEVELOPED (CF)	6,305	9,308	14,346
POST-DEVELOPED (CF)	5,050	7,602	11,955
PERCENT CHANGE	-19.90%	-18.33%	-16.67%

In Basin B the peak discharge has been reduced for each of the requisite stormwater events. In addition, the volumes leaving the sub basin for each of the storm events has been reduced. Together with a review of the timing of the hydrographs, this demonstrates that the proposed site changes will not increase flood damage at or downstream of the site.

Comparison of Peak Discharge Rates: Basin C:

AREA	2 YEAR STORM	10 YEAR STORM	100 YEAR STORM
PRE-DEVELOPED (CFS)	2.7	4.0	6.4
POST-DEVELOPED (CFS)	1.7	2.8	4.8
PERCENT CHANGE	-35.97%	-30.34%	-25.28%

Comparison of Volume Discharging: Basin C:

AREA	2 YEAR STORM	10 YEAR STORM	100 YEAR STORM
PRE-DEVELOPED (CF)	10,451	15,936	25,378
POST-DEVELOPED (CF)	6,577	10,725	18,159
PERCENT CHANGE	-37.07%	-32.70%	-28.45%

In Basin C the peak discharge has been reduced for each of the requisite stormwater events. In addition, the volumes leaving the sub basin for each of the storm events has been reduced. Together with a review of the timing of the hydrographs, this demonstrates that the proposed site changes will not increase flood damage at or downstream of the site.

WATER QUALITY COMPLIANCE:

Requirement: Stormwater runoff quality standards are applicable when the major development results in an increase of one-quarter acre or more of regulated motor vehicle surface.

The proposed development does not result in an increase of one-quarter acre or more of regulated motor vehicle surface. Therefore, stormwater runoff quality standards are not applicable to this site.

The water quality standards have been met for all sub basins.

GROUNDWATER RECHARGE STANDARDS:

Requirement: Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from pre-construction to post-construction for the two-year storm is infiltrated.

Analysis of pre and post developed infiltration for the 2-year storm event is as follows:

Basin A
Pre-Developed Discharge Volume: 27,955 CF (Hydrograph 3)
Post-Developed Discharge Volume: 8,532 CF (Hydrograph 14)
Therefore, the post developed volume leaving this portion of the site has been reduced.

Basin B
Pre-Developed Discharge Volume: 6,305 CF (Hydrograph 4)
Post-Developed Discharge Volume: 5,050 CF (Hydrograph 17)
Therefore, the post developed volume leaving this portion of the site has been reduced.

Basin C
Pre-Developed Discharge Volume: 10,451 CF (Hydrograph 7)
Post-Developed Discharge Volume: 6,577 CF (Hydrograph 20)
Therefore, the post developed volume leaving this portion of the site has been reduced.

This analysis demonstrates that the post developed stormwater volume leaving Basins A, B and C of the site has been reduced. Therefore, stormwater volume infiltration has been increased in the post developed condition.

OFFSITE STABILITY COMPLIANCE:

The discharge velocity of the proposed infiltration basin during the 100-year storm is 2.4 ft/s, which is less than the maximum allowable velocity of 3.5 ft/s for sandy clay loam as set forth in Standards for Soil Erosion and Sediment Control in New Jersey Table 11-1. Therefore, offsite stability compliance has been demonstrated.

GREEN INFRASTRUCTURE REQUIREMENTS:

The site plan for this site results in the water quantity, water quality and groundwater recharge requirements being met through the use of an infiltration basin with a watershed of less than 2.5 acres. Therefore, the stormwater management requirements have been met utilizing green infrastructure BMP's as required.

CONCLUSION:

The proposed site plan stormwater system has been designed to be in compliance with the municipal stormwater control ordinance.

APPENDIX A

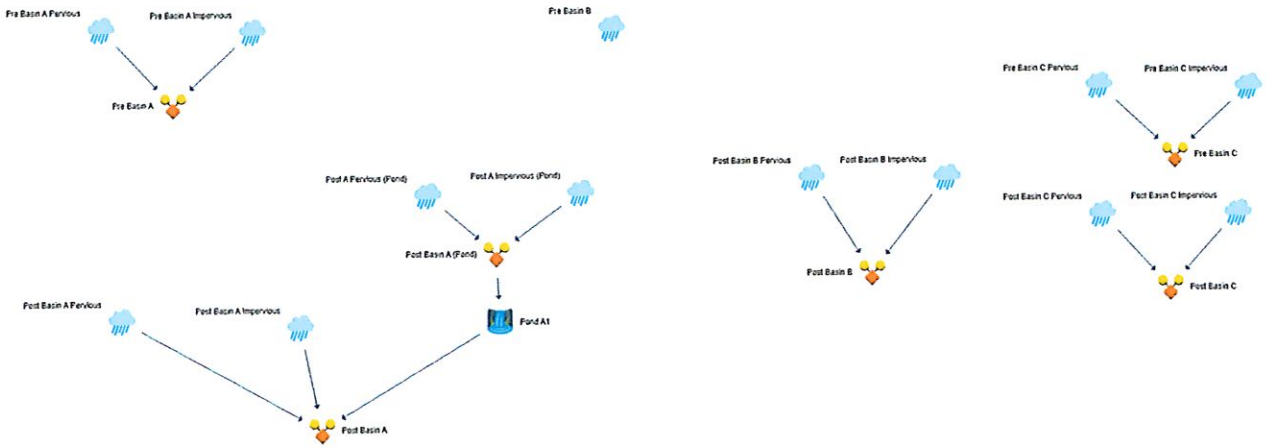
TR55 STORMWATER ROUTING

Basin Model

Hydrology Studio v 3.0.0.27

Project Name: AN-153

10-16-2023



Hydrograph by Return Period

Project Name: AN-153

10-16-2023

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Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Outflow (cfs)							
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
1	NRCS Runoff	Pre Basin A Pervious		0.389			0.867			1.808
2	NRCS Runoff	Pre Basin A Impervious		6.710			9.747			14.82
3	Junction	Pre Basin A		7.091			10.61			16.63
4	NRCS Runoff	Pre Basin B		2.058			2.989			4.542
5	NRCS Runoff	Pre Basin C Pervious		0.281			0.572			1.117
6	NRCS Runoff	Pre Basin C Impervious		2.390			3.472			5.279
7	Junction	Pre Basin C		2.669			4.044			6.396
8	NRCS Runoff	Post Basin A Pervious		0.444			0.973			2.005
9	NRCS Runoff	Post Basin A Impervious		1.699			2.468			3.752
10	NRCS Runoff	Post A Pervious (Pond)		0.606			1.236			2.413
11	NRCS Runoff	Post A Impervious (Pond)		3.917			5.689			8.649
12	Junction	Post Basin A (Pond)		4.518			6.925			11.06
13	Pond Route	Pond A1		0.144			4.188			10.00
14	Junction	Post Basin A		2.135			6.592			15.61
15	NRCS Runoff	Post Basin B Pervious		0.109			0.220			0.426
16	NRCS Runoff	Post Basin B Impervious		1.552			2.254			3.425
17	Junction	Post Basin B		1.661			2.474			3.851
18	NRCS Runoff	Post Basin C Pervious		0.561			1.144			2.235
19	NRCS Runoff	Post Basin C Impervious		1.152			1.673			2.544
20	Junction	Post Basin C		1.709			2.817			4.779

Hydrograph 2-yr Summary

Project Name: AN-153

10-16-2023

Hydrology Studio v 3.0.0.27

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (hrs)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	NRCS Runoff	Pre Basin A Pervious	0.389	12.20	1,464	----		
2	NRCS Runoff	Pre Basin A Impervious	6.710	12.17	26,491	----		
3	Junction	Pre Basin A	7.091	12.17	27,955	1, 2		
4	NRCS Runoff	Pre Basin B	2.058	12.10	6,305	----		
5	NRCS Runoff	Pre Basin C Pervious	0.281	12.20	1,014	----		
6	NRCS Runoff	Pre Basin C Impervious	2.390	12.17	9,437	----		
7	Junction	Pre Basin C	2.669	12.17	10,451	5, 6		
8	NRCS Runoff	Post Basin A Pervious	0.444	12.20	1,655	----		
9	NRCS Runoff	Post Basin A Impervious	1.699	12.17	6,708	----		
10	NRCS Runoff	Post A Pervious (Pond)	0.606	12.20	2,191	----		
11	NRCS Runoff	Post A Impervious (Pond)	3.917	12.17	15,463	----		
12	Junction	Post Basin A (Pond)	4.518	12.17	17,654	10, 11		
13	Pond Route	Pond A1	0.144	13.00	169	12	608.01	8,003
14	Junction	Post Basin A	2.135	12.17	8,532	8, 9, 13		
15	NRCS Runoff	Post Basin B Pervious	0.109	12.10	295	----		
16	NRCS Runoff	Post Basin B Impervious	1.552	12.10	4,755	----		
17	Junction	Post Basin B	1.661	12.10	5,050	15, 16		
18	NRCS Runoff	Post Basin C Pervious	0.561	12.20	2,029	----		
19	NRCS Runoff	Post Basin C Impervious	1.152	12.17	4,548	----		
20	Junction	Post Basin C	1.709	12.17	6,577	18, 19		

Hydrograph Report

Project Name: AN-153

Hydrology Studio v 3.0.0.27

10-16-2023

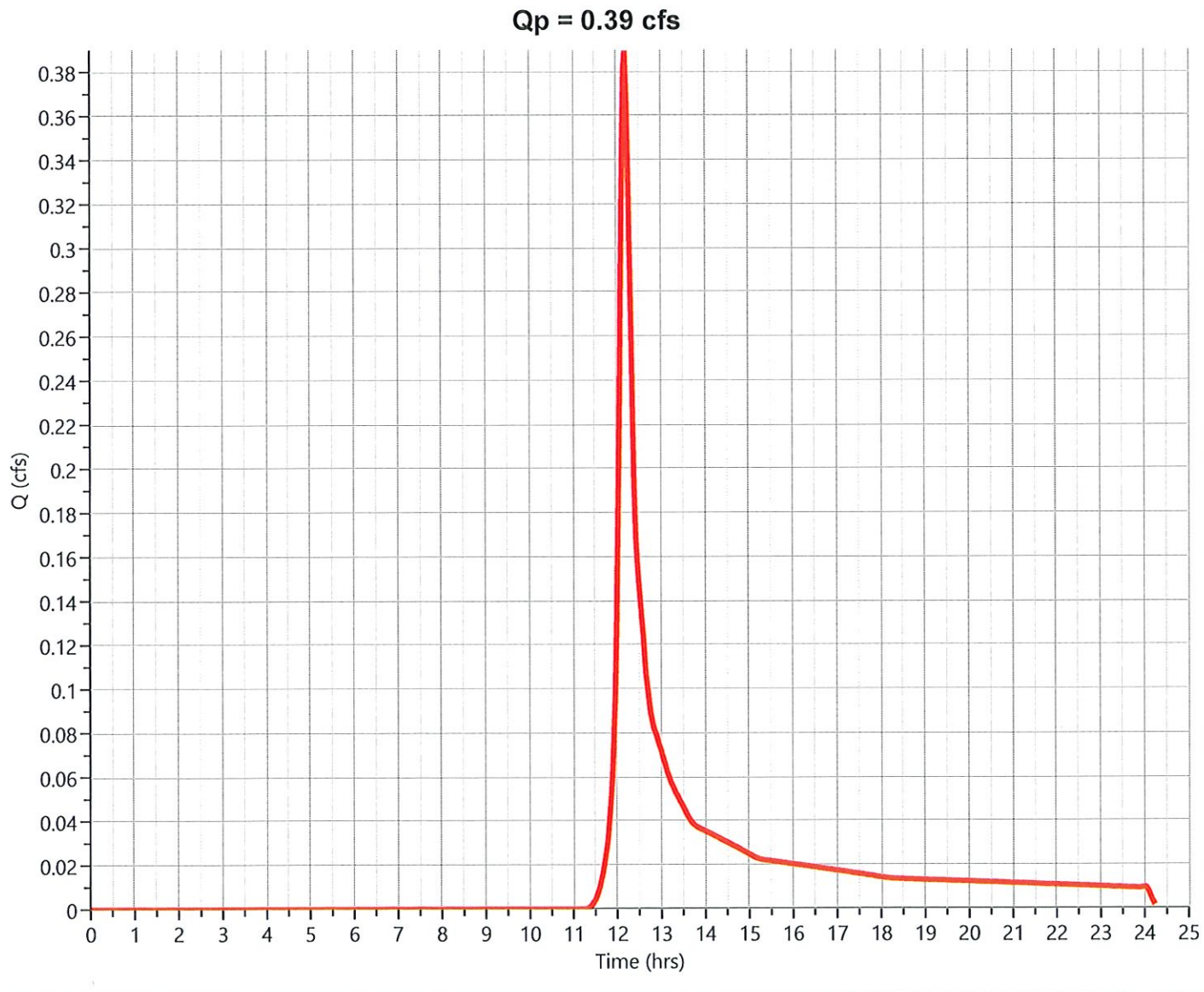
Pre Basin A Pervious

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.389 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Runoff Volume	= 1,464 cuft
Drainage Area	= 0.45 ac	Curve Number	= 70*
Tc Method	= User	Time of Conc. (Tc)	= 12.04 min
Total Rainfall	= 3.27 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.41	70	Woods, Good Condition
0.04	74	Open Space, Good Condition
0.45	**70**	Weighted CN Method Employed



Hydrograph Report

Project Name: AN-153

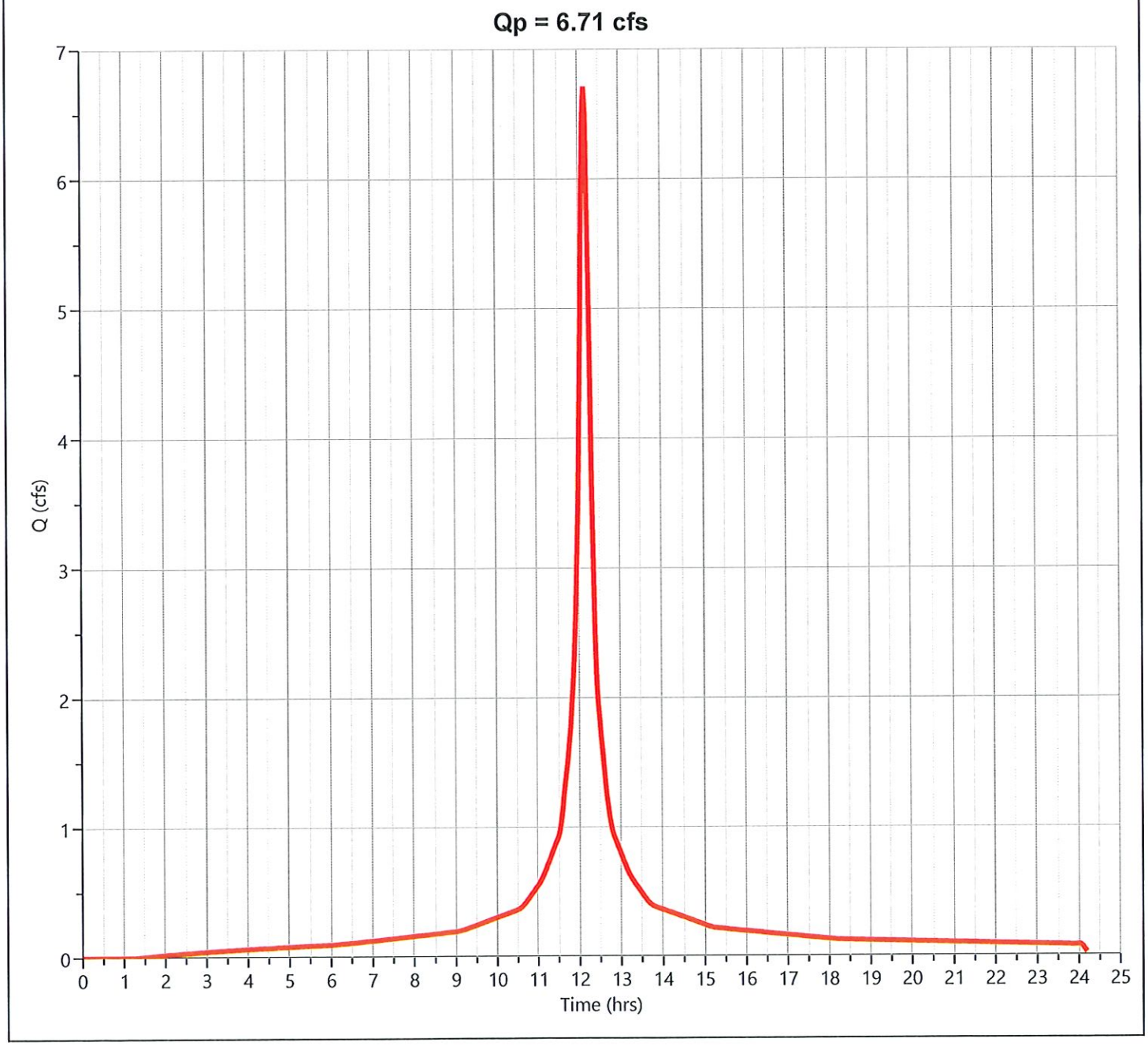
Hydrology Studio v 3.0.0.27

10-16-2023

Pre Basin A Impervious

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 6.710 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 26,491 cuft
Drainage Area	= 2.33 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 12.04 min
Total Rainfall	= 3.27 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

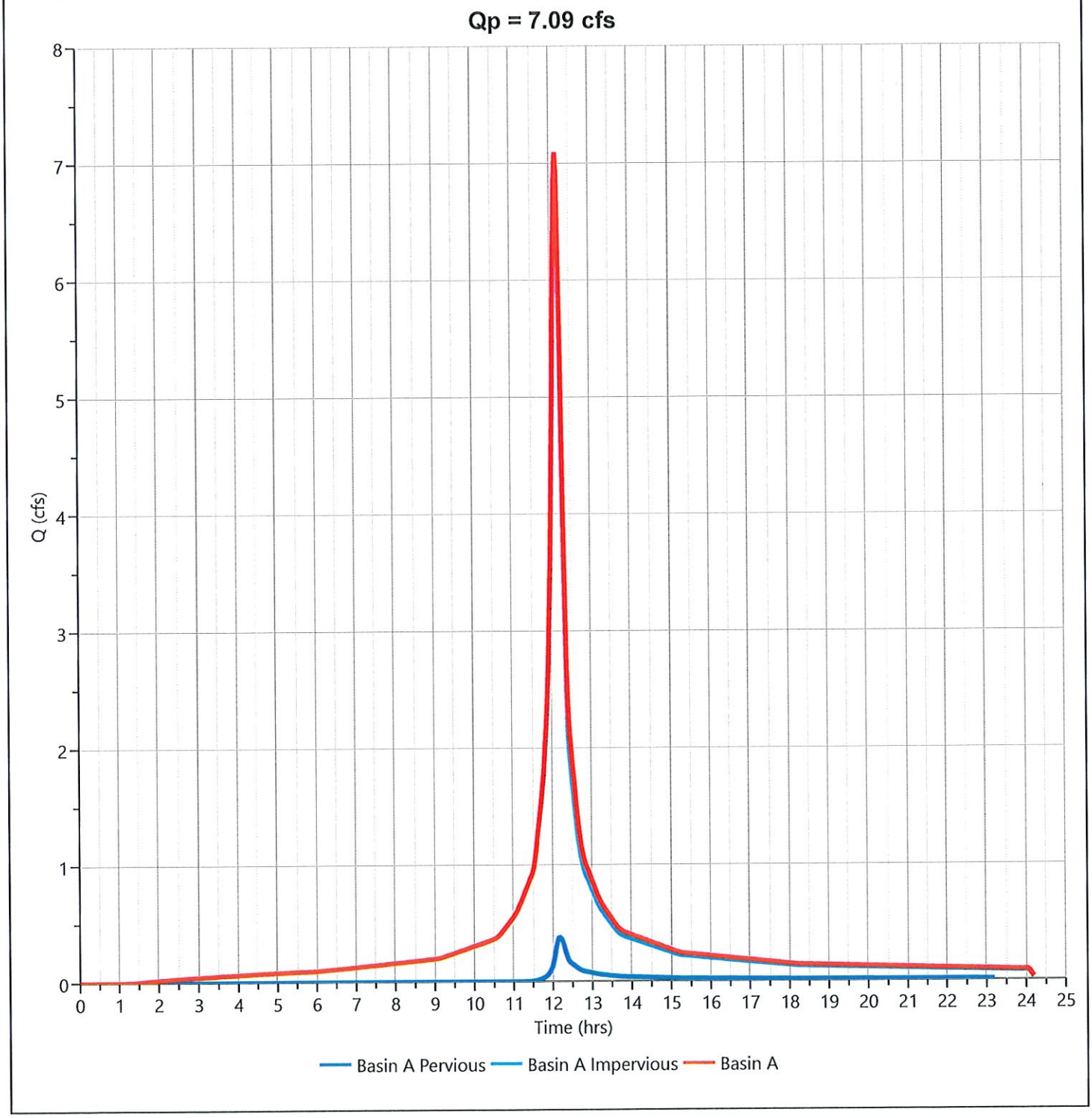
Hydrology Studio v 3.0.0.27

10-16-2023

Pre Basin A

Hyd. No. 3

Hydrograph Type	= Junction	Peak Flow	= 7.091 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 27,955 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 2.78 ac



Hydrograph Report

Project Name: AN-153

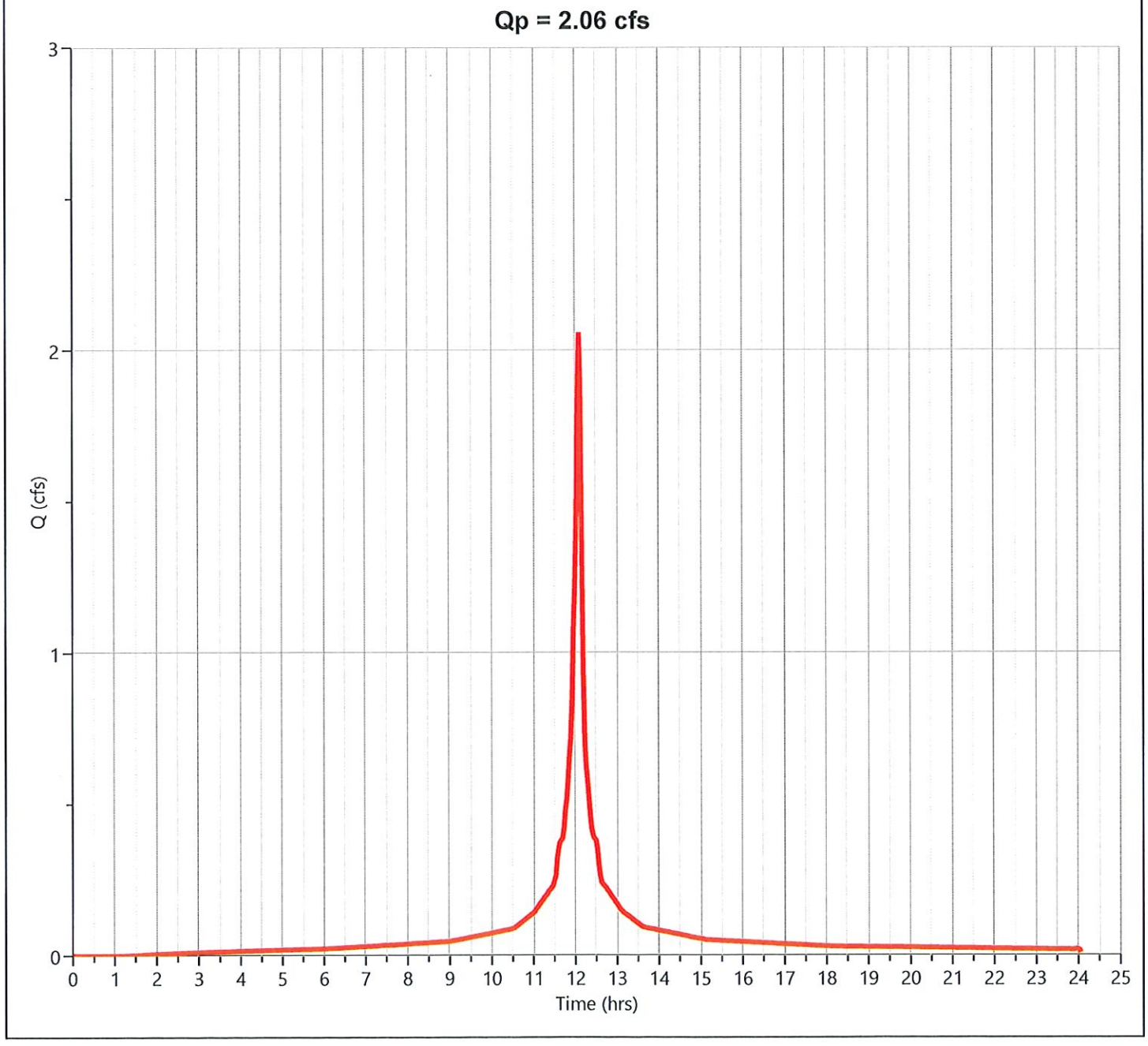
Hydrology Studio v 3.0.0.27

10-16-2023

Pre Basin B

Hyd. No. 4

Hydrograph Type	= NRCS Runoff	Peak Flow	= 2.058 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.10 hrs
Time Interval	= 2 min	Runoff Volume	= 6,305 cuft
Drainage Area	= 0.61 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 6.0 min
Total Rainfall	= 3.27 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

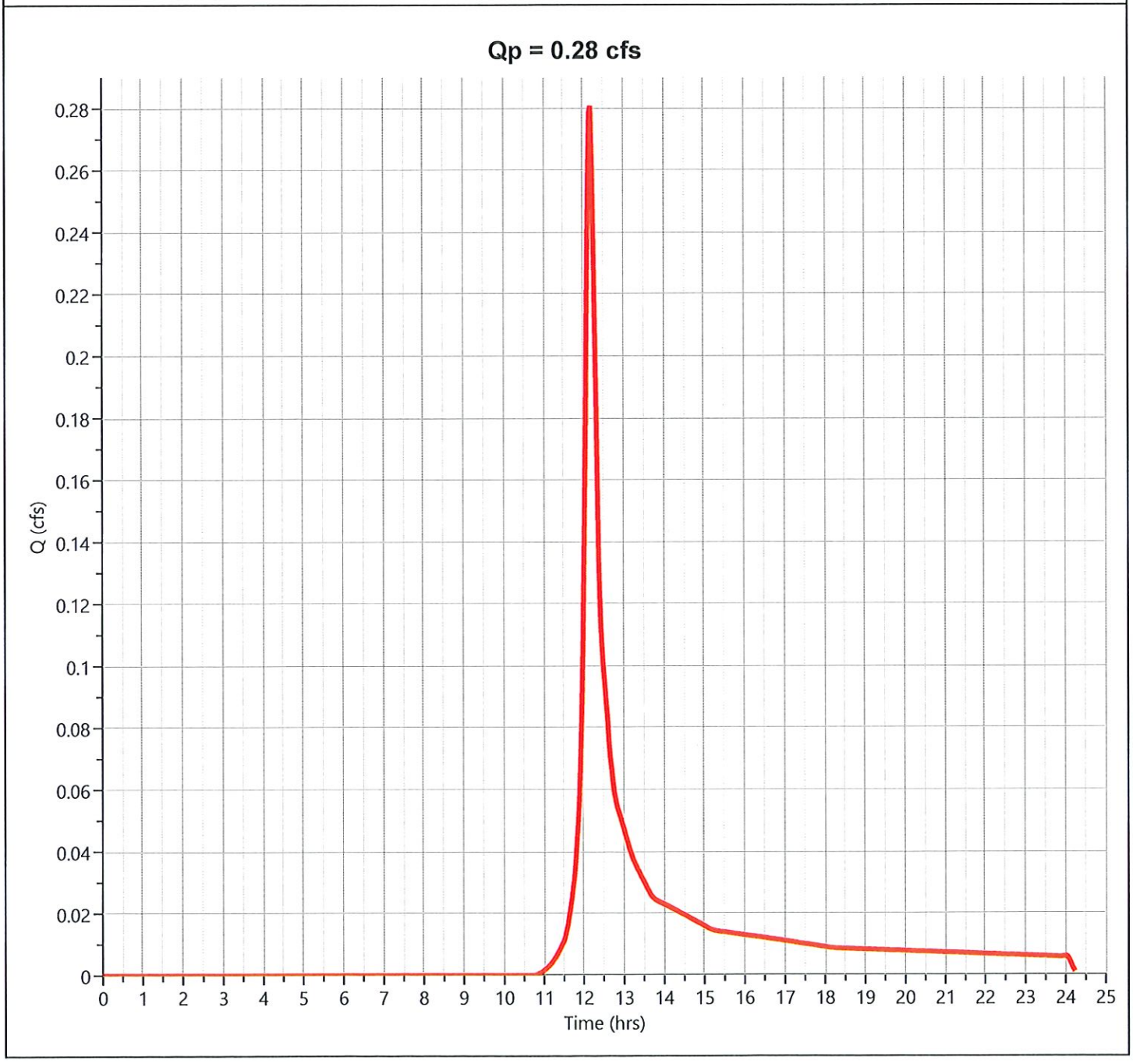
Hydrology Studio v 3.0.0.27

10-16-2023

Pre Basin C Pervious

Hyd. No. 5

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.281 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Runoff Volume	= 1,014 cuft
Drainage Area	= 0.25 ac	Curve Number	= 74
Tc Method	= User	Time of Conc. (Tc)	= 10.24 min
Total Rainfall	= 3.27 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

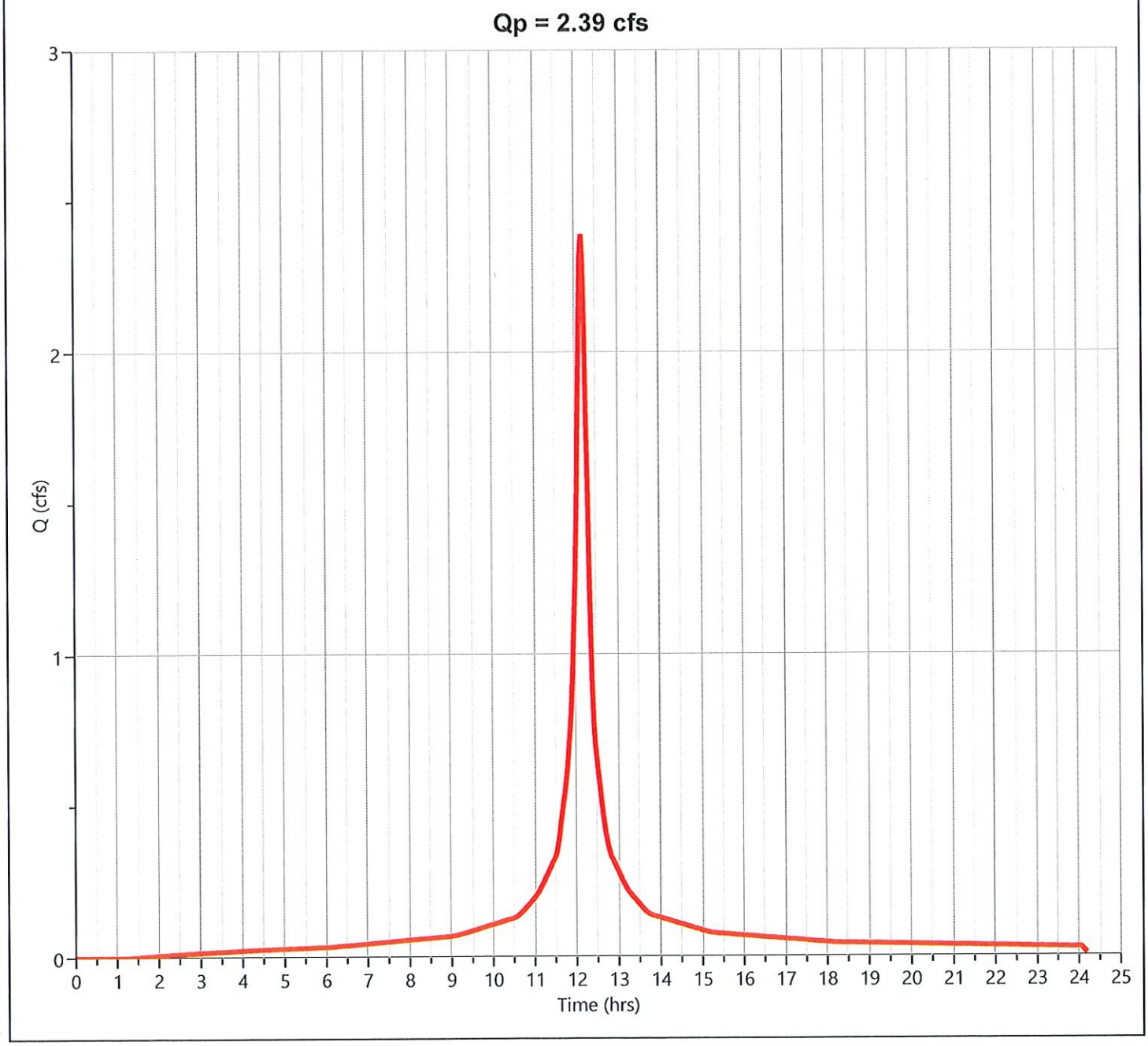
Hydrology Studio v 3.0.0.27

10-16-2023

Pre Basin C Impervious

Hyd. No. 6

Hydrograph Type	= NRCS Runoff	Peak Flow	= 2.390 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 9,437 cuft
Drainage Area	= 0.83 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 10.24 min
Total Rainfall	= 3.27 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

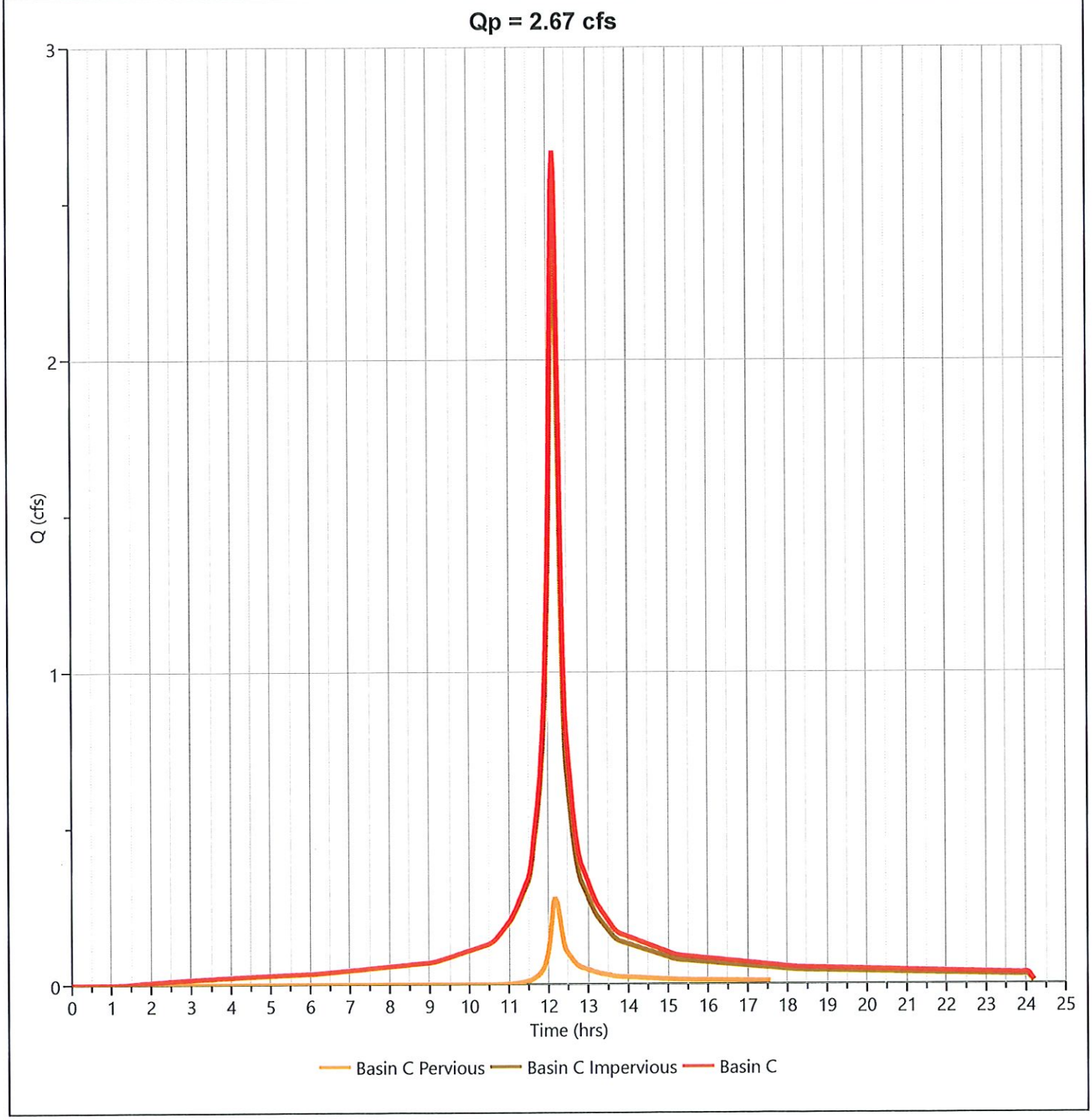
Hydrology Studio v 3.0.0.27

10-16-2023

Pre Basin C

Hyd. No. 7

Hydrograph Type	= Junction	Peak Flow	= 2.669 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 10,451 cuft
Inflow Hydrographs	= 5, 6	Total Contrib. Area	= 1.08 ac



Hydrograph Report

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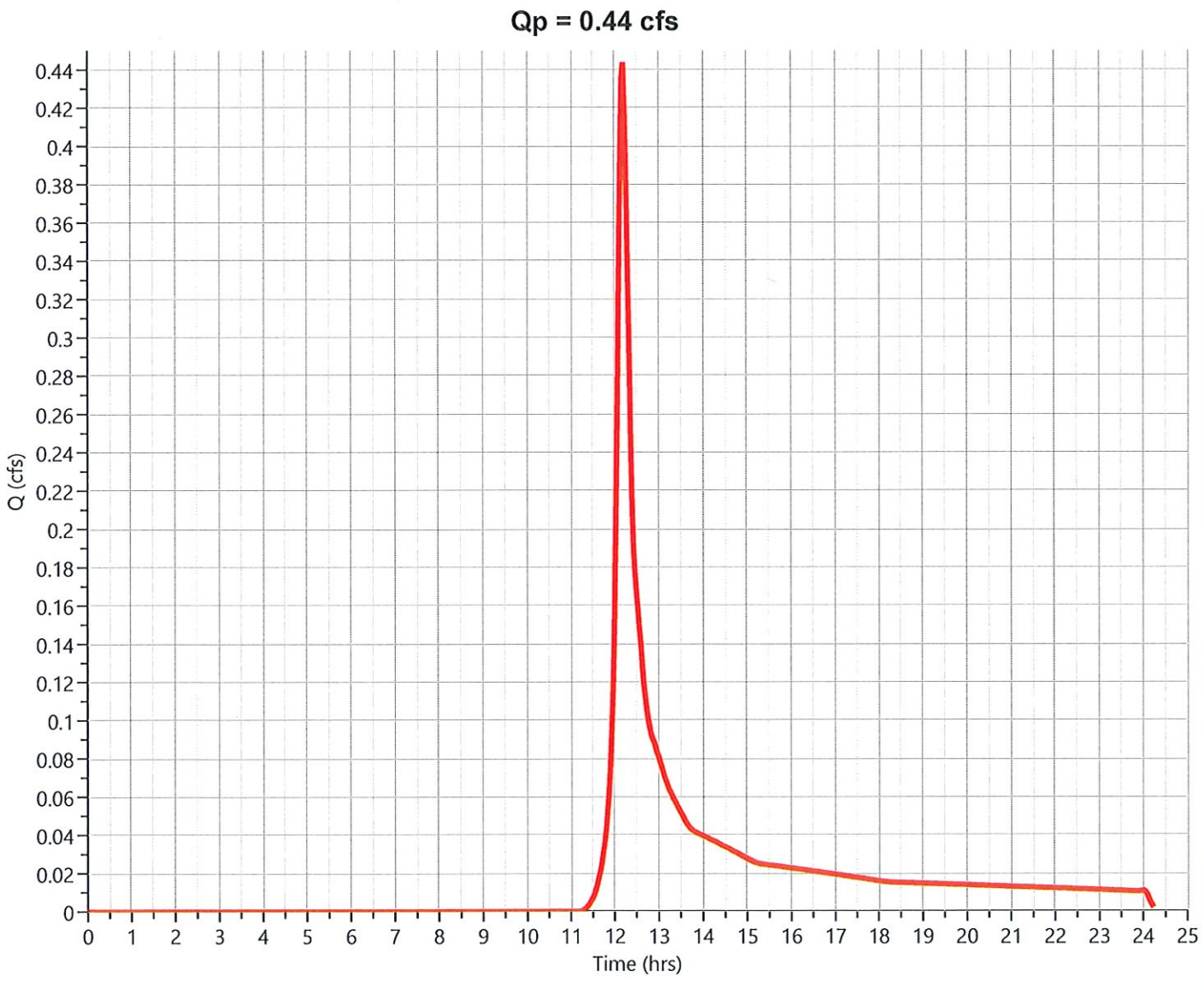
Post Basin A Pervious

Hyd. No. 8

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.444 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Runoff Volume	= 1,655 cuft
Drainage Area	= 0.49 ac	Curve Number	= 70.65*
Tc Method	= User	Time of Conc. (Tc)	= 12.3 min
Total Rainfall	= 3.27 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.41	70	Woods, Good
0.08	74	Open Space, Good
0.49	**71**	Weighted CN Method Employed



Hydrograph Report

Project Name: AN-153

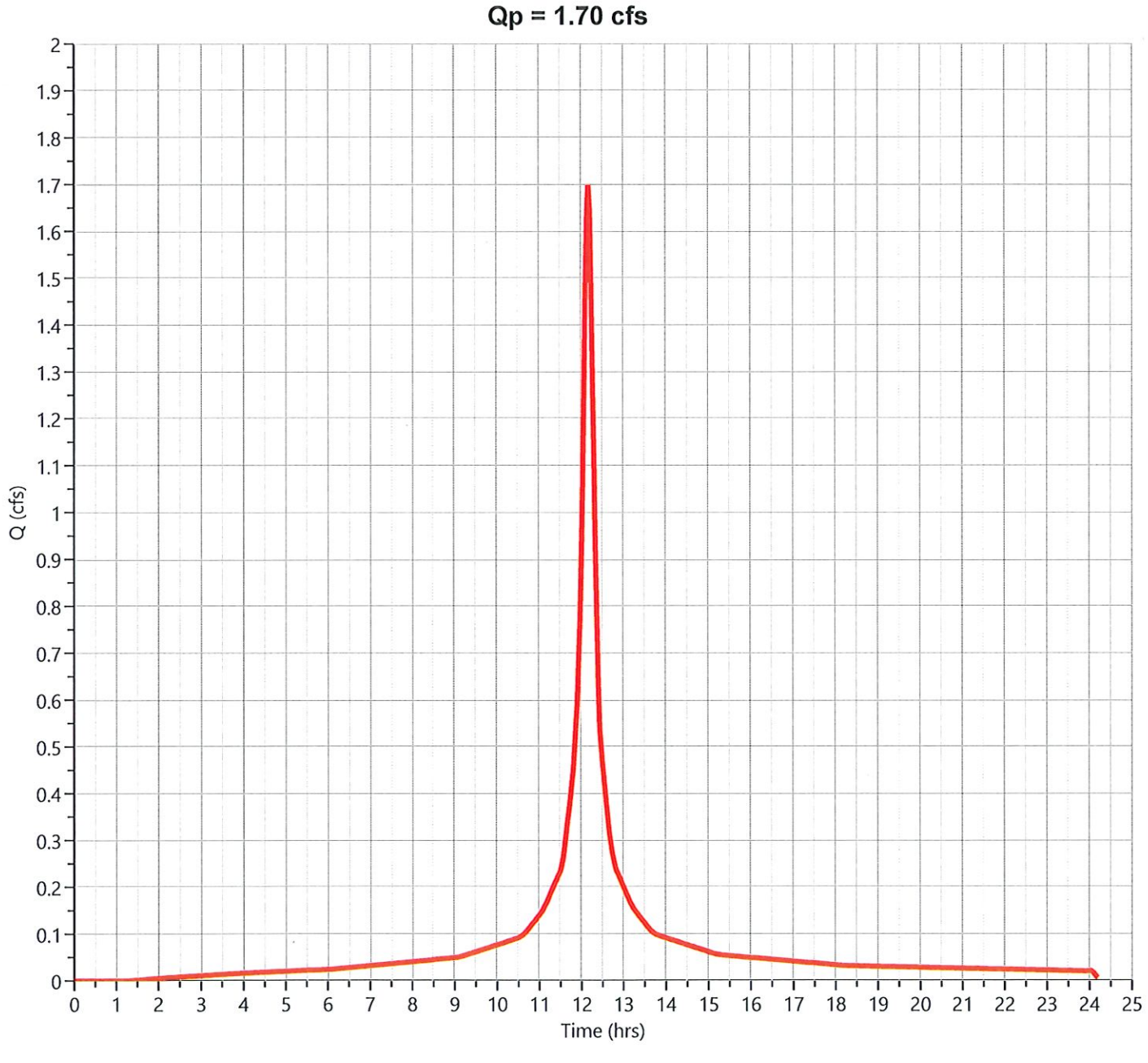
Hydrology Studio v 3.0.0.27

10-16-2023

Post Basin A Impervious

Hyd. No. 9

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.699 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 6,708 cuft
Drainage Area	= 0.59 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 12.3 min
Total Rainfall	= 3.27 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

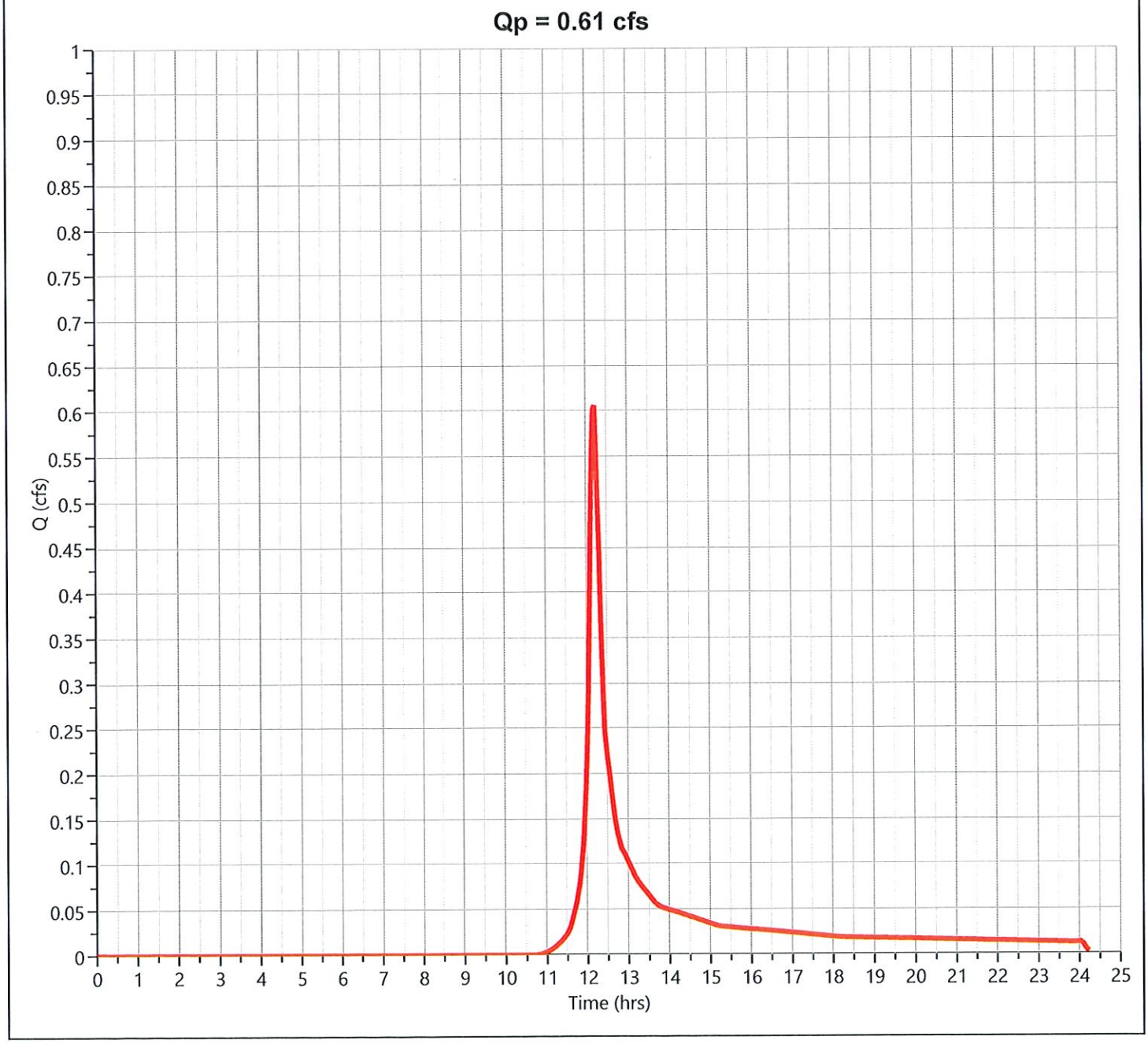
Hydrology Studio v 3.0.0.27

10-16-2023

Post A Pervious (Pond)

Hyd. No. 10

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.606 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Runoff Volume	= 2,191 cuft
Drainage Area	= 0.54 ac	Curve Number	= 74
Tc Method	= User	Time of Conc. (Tc)	= 12.3 min
Total Rainfall	= 3.27 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

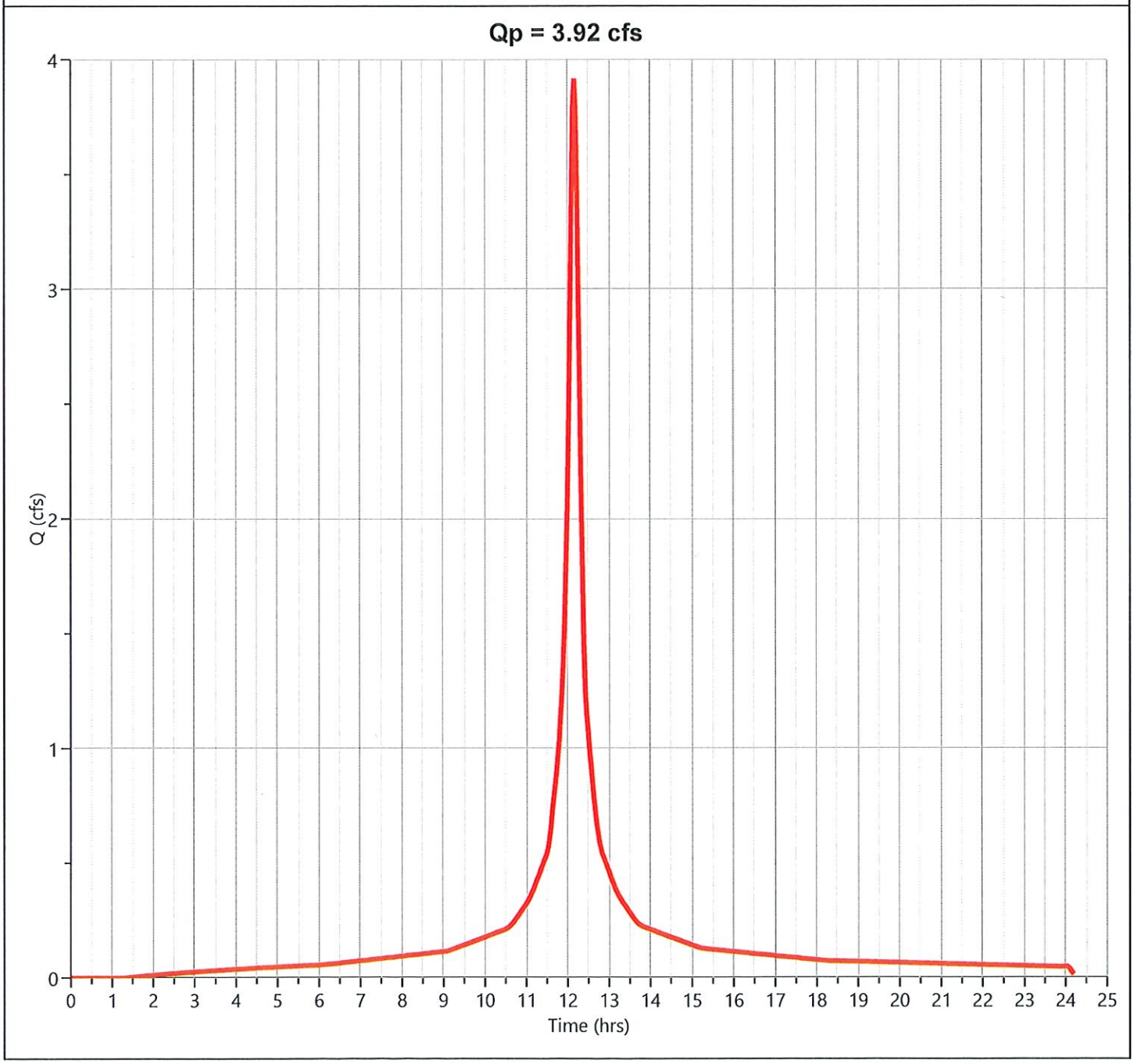
Hydrology Studio v 3.0.0.27

10-16-2023

Post A Impervious (Pond)

Hyd. No. 11

Hydrograph Type	= NRCS Runoff	Peak Flow	= 3.917 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 15,463 cuft
Drainage Area	= 1.36 ac	Curve Number	= 98
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 12.3 min
Total Rainfall	= 3.27 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Tc by TR55 Worksheet

Project Name: AN-153

Hydrology Studio v 3.0.0.27

10-16-2023

A Impervious (Pond)
NRCS Runoff

Hyd. No. 11

Description	Segments A	B	C	Tc (min)
Sheet Flow				
Description	Range (Natural)			
Manning's n	0.130	0.013	0.013	
Flow Length (ft)	100			
2-yr, 24-hr Precip. (in)	2.28	2.28	2.28	
Land Slope (%)	1.75			
Travel Time (min)	**10.92**	**0.00**	**0.00**	**10.92**
Shallow Concentrated Flow				
Flow Length (ft)	146.8			
Watercourse Slope (%)	1.20	0.00	0.00	
Surface Description	Unpaved	Paved	Paved	
Average Velocity (ft/s)	1.77			
Travel Time (min)	**1.38**	**0.00**	**0.00**	**1.38**
Channel Flow				
X-sectional Flow Area (sqft)				
Wetted Perimeter (ft)				
Channel Slope (%)				
Manning's n	0.013	0.013	0.013	
Velocity (ft/s)				
Flow Length (ft)				
Travel Time (min)	**0.00**	**0.00**	**0.00**	**0.00**
Total Travel Time				**12.3 min**

Hydrograph Report

Project Name: AN-153

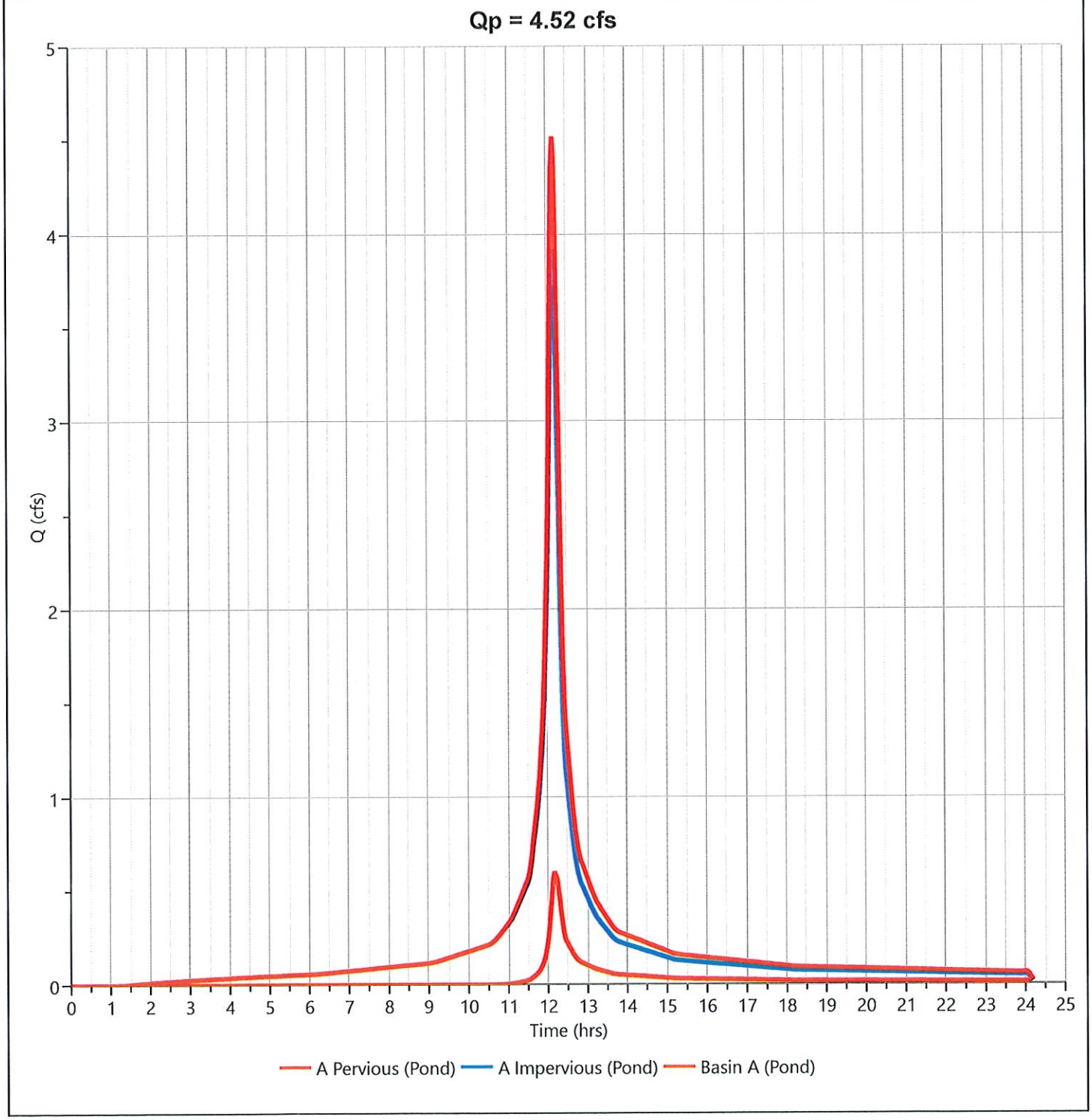
Hydrology Studio v 3.0.0.27

10-16-2023

Post Basin A (Pond)

Hyd. No. 12

Hydrograph Type	= Junction	Peak Flow	= 4.518 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 17,654 cuft
Inflow Hydrographs	= 10, 11	Total Contrib. Area	= 1.9 ac



Hydrograph Report

Project Name: AN-153

Hydrology Studio v 3.0.0.27

10-16-2023

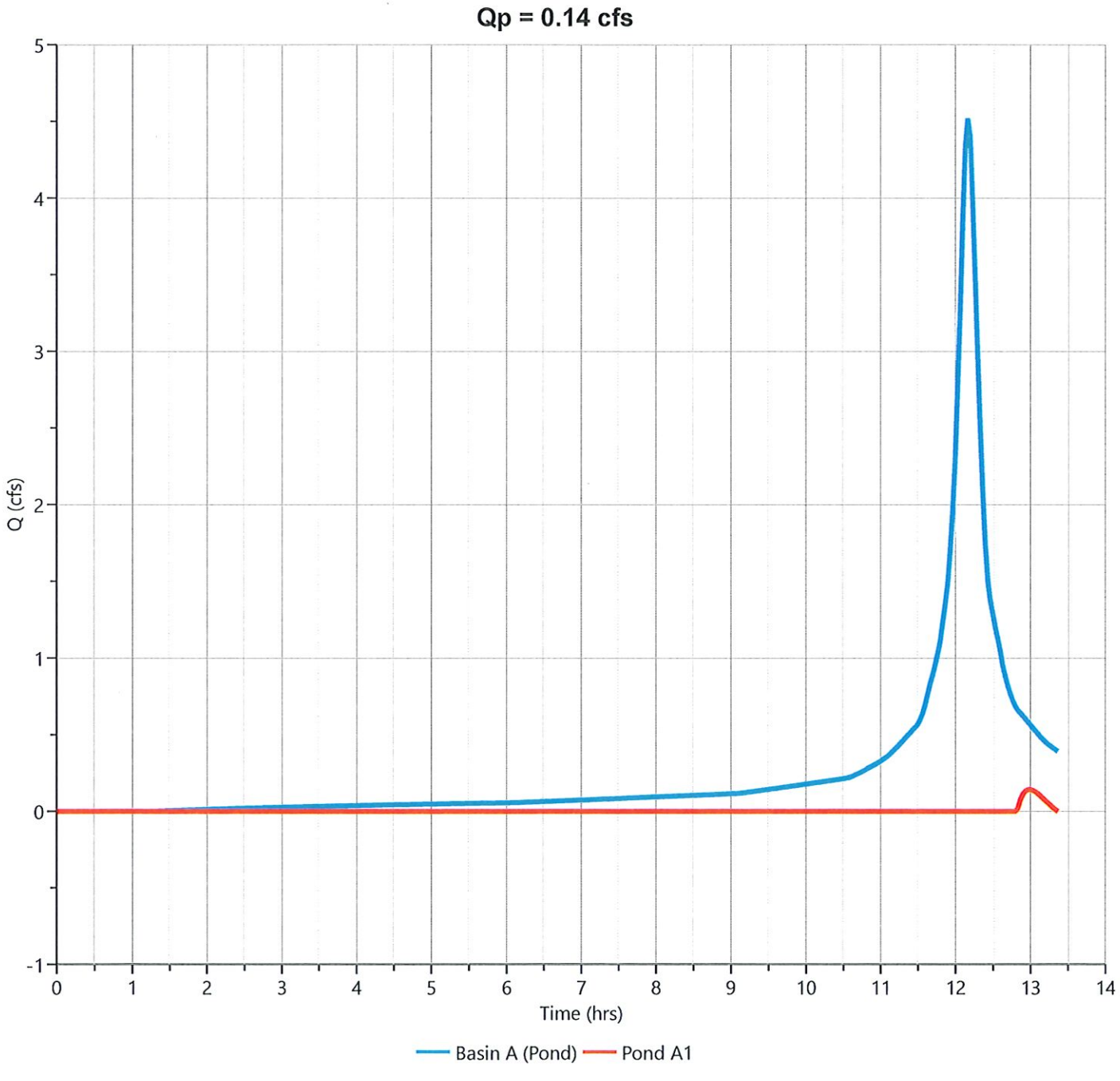
Pond A1

Hyd. No. 13

Hydrograph Type	= Pond Route	Peak Flow	= 0.144 cfs
Storm Frequency	= 2-yr	Time to Peak	= 13.00 hrs
Time Interval	= 2 min	Hydrograph Volume	= 169 cuft
Inflow Hydrograph	= 12 - Basin A (Pond)	Max. Elevation	= 608.01 ft
Pond Name	= Pond A	Max. Storage	= 8,003 cuft

Pond Routing by Storage Indication Method

Center of mass detention time = 9 min



Pond Report

Project Name: AN-153

Hydrology Studio v 3.0.0.27

10-16-2023

Pond A

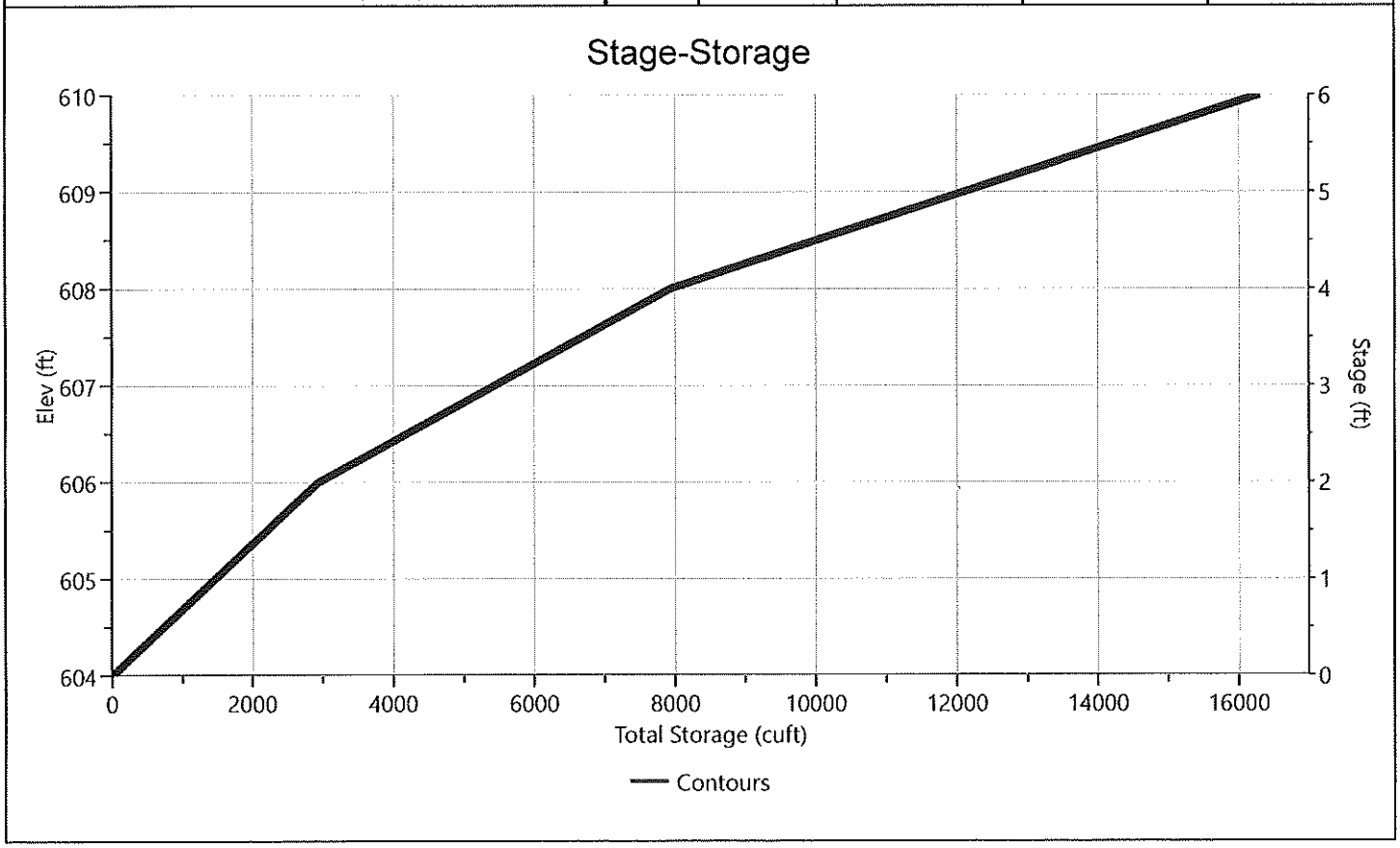
Stage-Storage

User Defined Contours

Description	Input
Bottom Elevation, ft	604.00
Voids (%)	100.00
Volume Calc	None

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour Area (sqft)	Incr. Storage (cuft)	Total Storage (cuft)
0.00	604.00	1,032	0.000	0.000
2.00	606.00	1,916	2,948	2,948
4.00	608.00	3,089	5,004	7,952
6.00	610.00	5,275	8,364	16,316



Pond Report

Project Name: AN-153

Hydrology Studio v 3.0.0.27

10-16-2023

Pond A

Stage-Discharge

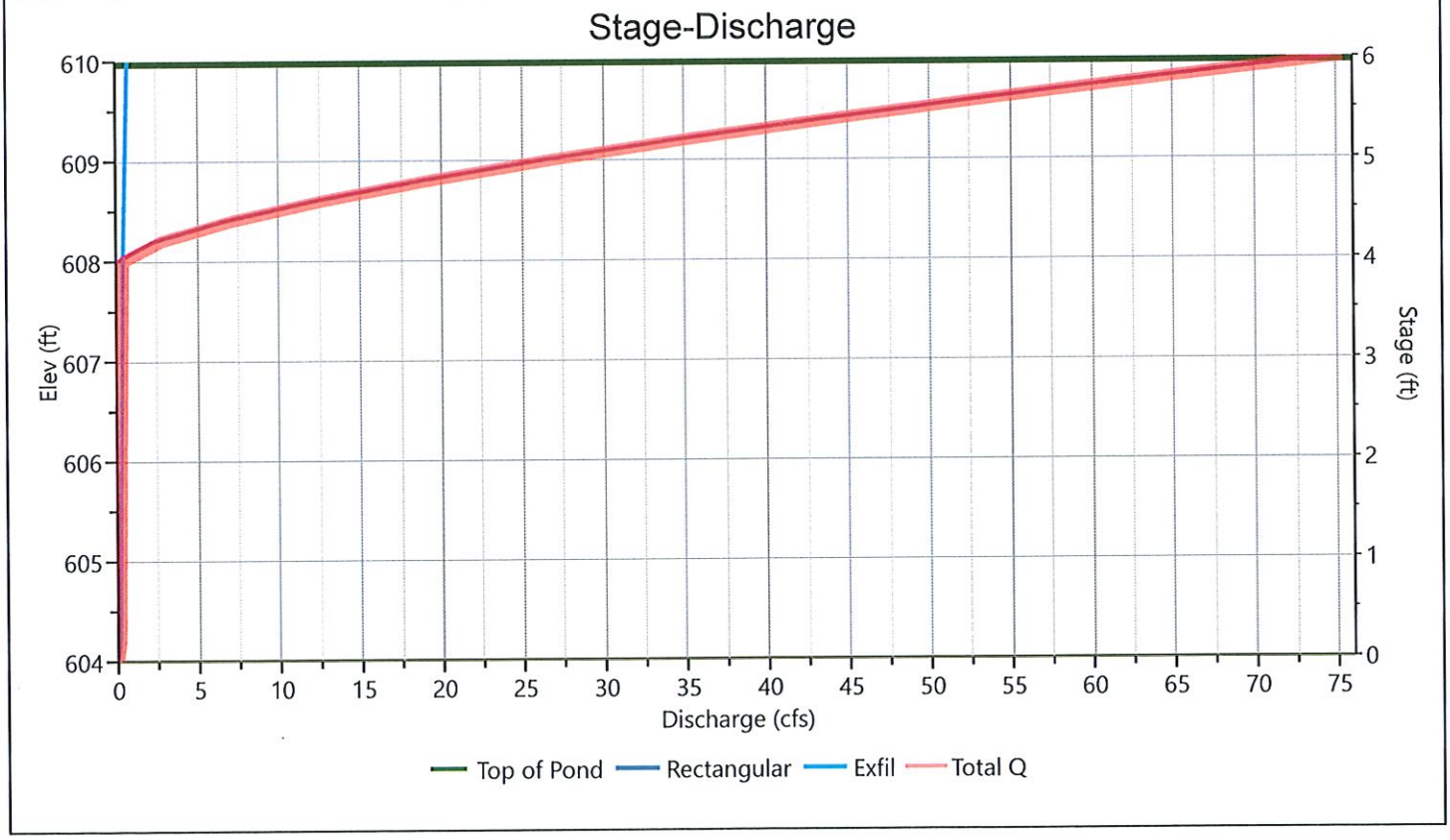
Culvert / Orifices	Culvert	Orifices		
		1	2	3
Rise, in				
Span, in				
No. Barrels				
Invert Elevation, ft				
Orifice Coefficient, Co				
Length, ft				
Barrel Slope, %				
N-Value, n	0.000			

Weirs	Riser*	Weirs		
		1	2	3
Shape / Type		Rectangular		
Crest Elevation, ft		608		
Crest Length, ft		8		
Angle, deg				
Weir Coefficient, Cw		3.3		

Perforated Riser	
Hole Diameter, in	
No. holes	
Invert Elevation, ft	
Height, ft	
Orifice Coefficient, Co	

Ancillary	
Exfiltration, in/hr	6.00**

*Routes through Culvert. **Exfiltration extracted from outflow hydrograph. Rate applied to contours.



Pond Report

Project Name: AN-153

Hydrology Studio v 3.0.0.27

10-16-2023

Pond A

Stage-Storage-Discharge Summary

Stage (ft)	Elev. (ft)	Storage (cuft)	Culvert (cfs)	Orifices, cfs			Riser (cfs)	Weirs, cfs			Pf Riser (cfs)	Exfil (cfs)	User (cfs)	Total (cfs)
				1	2	3		1	2	3				
0.00	604.00	0.000						0.000				0.000		0.000
2.00	606.00	2,948						0.000				0.266		0.266
4.00	608.00	7,952						0.000				0.429		0.429
6.00	610.00	16,316						74.67				0.733		75.40

Suffix key: ic = inlet control, oc = outlet control, s = submerged weir

Pond Report

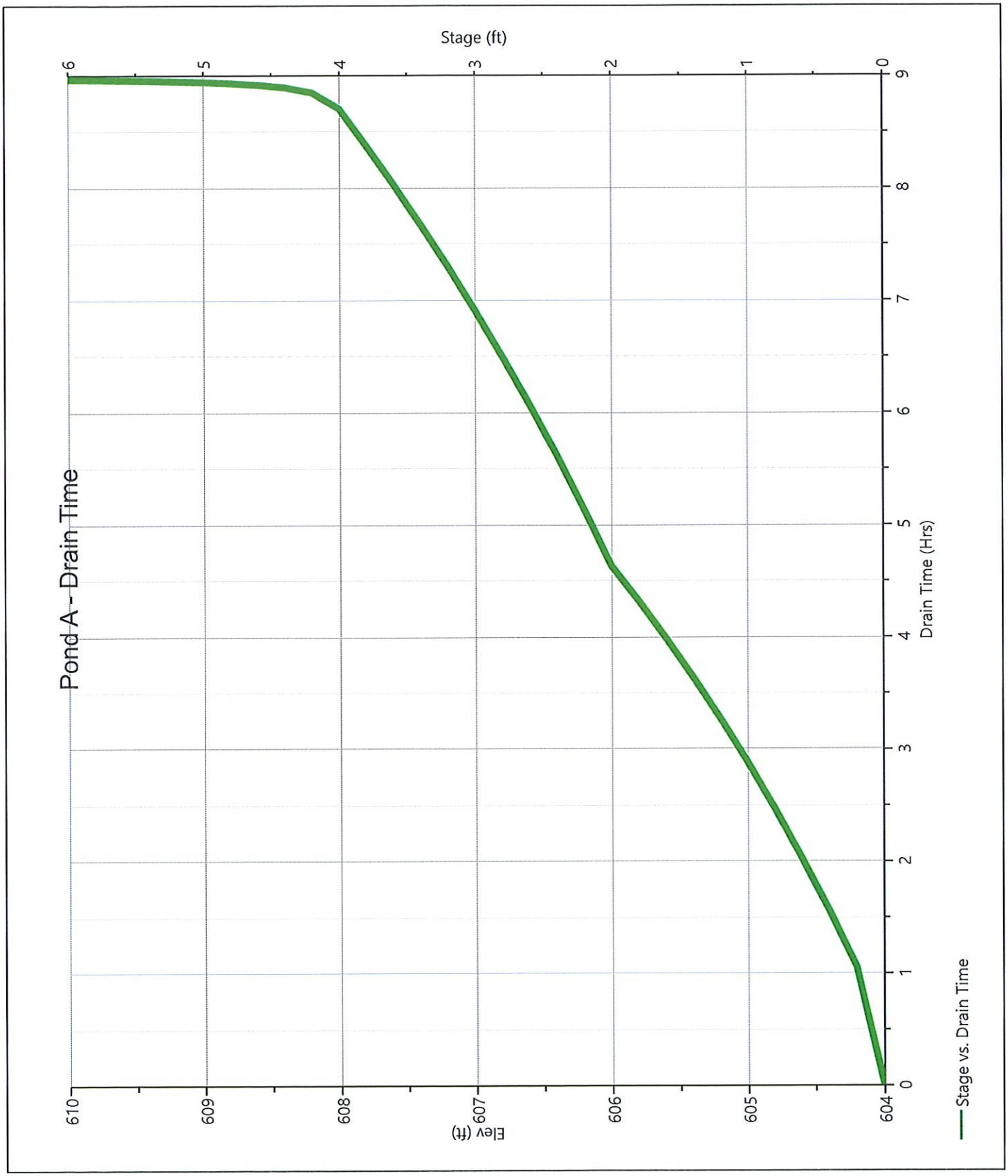
Project Name: AN-153

Hydrology Studio v 3.0.0.27

10-16-2023

Pond A

Pond Drawdown



Hydrograph Report

Project Name: AN-153

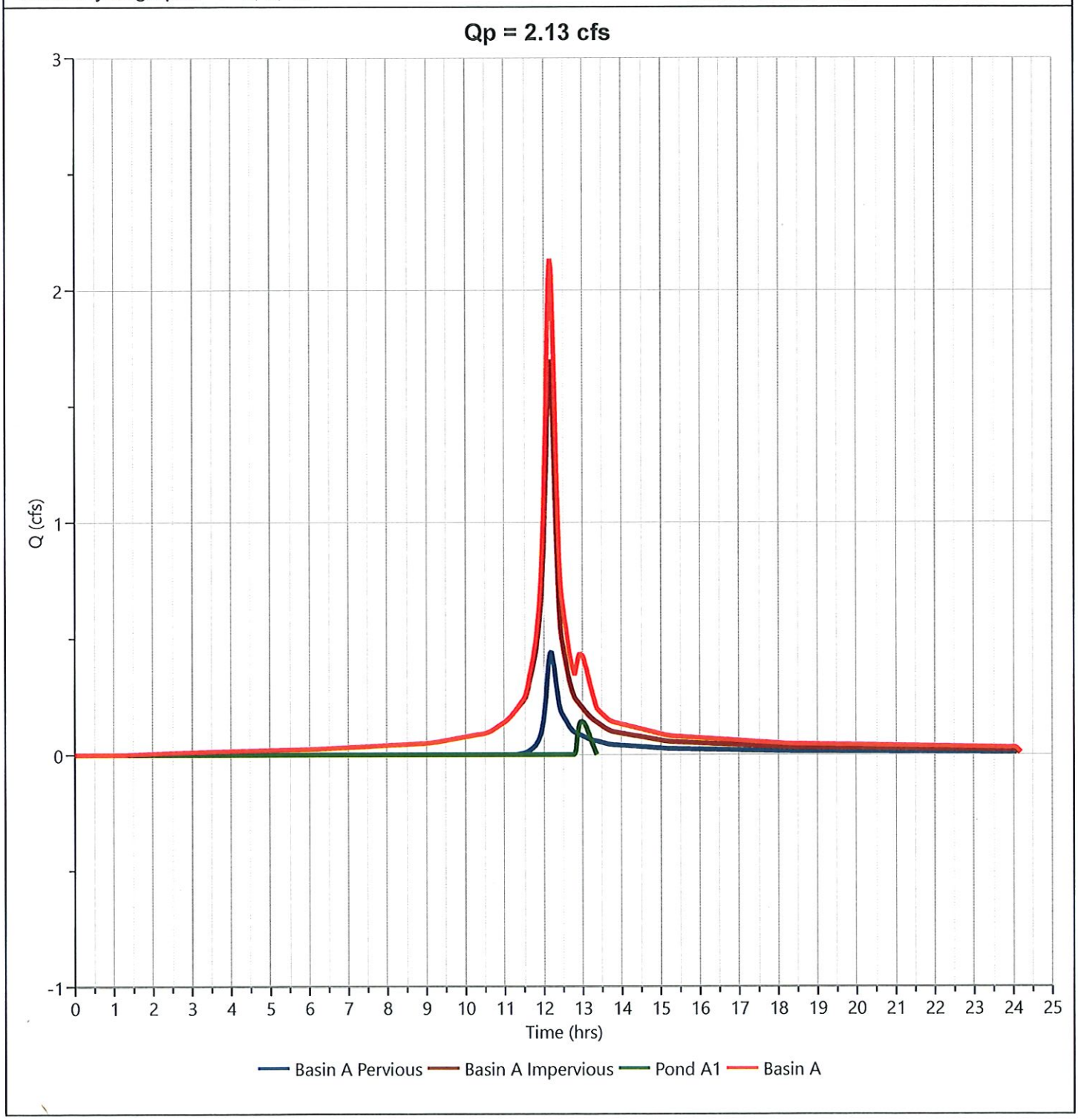
Hydrology Studio v 3.0.0.27

10-16-2023

Post Basin A

Hyd. No. 14

Hydrograph Type	= Junction	Peak Flow	= 2.135 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 8,532 cuft
Inflow Hydrographs	= 8, 9, 13	Total Contrib. Area	= 1.08 ac



Hydrograph Report

Project Name: AN-153

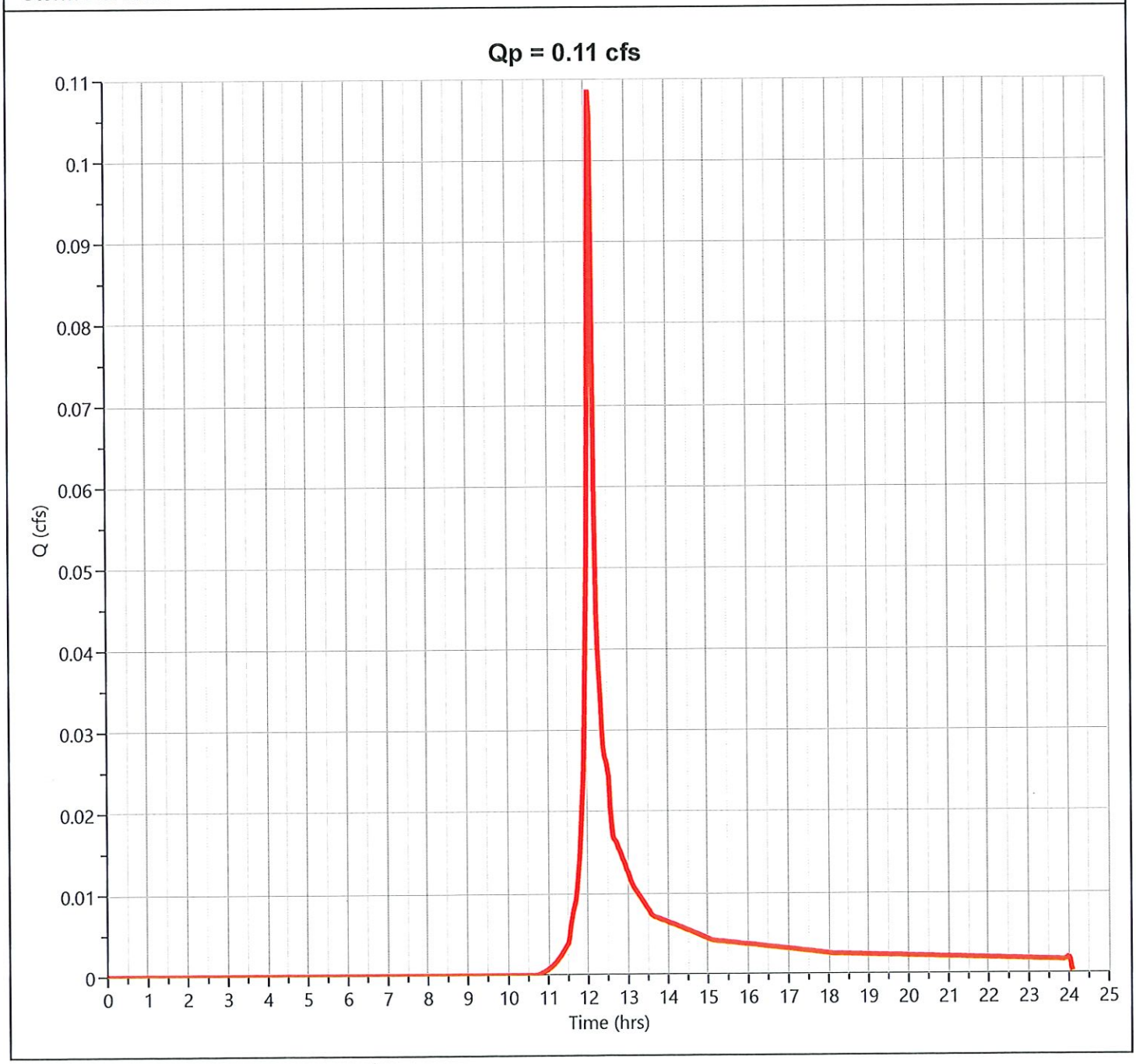
Hydrology Studio v 3.0.0.27

10-16-2023

Post Basin B Pervious

Hyd. No. 15

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.109 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.10 hrs
Time Interval	= 2 min	Runoff Volume	= 295 cuft
Drainage Area	= 0.08 ac	Curve Number	= 74
Tc Method	= User	Time of Conc. (Tc)	= 6.0 min
Total Rainfall	= 3.27 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

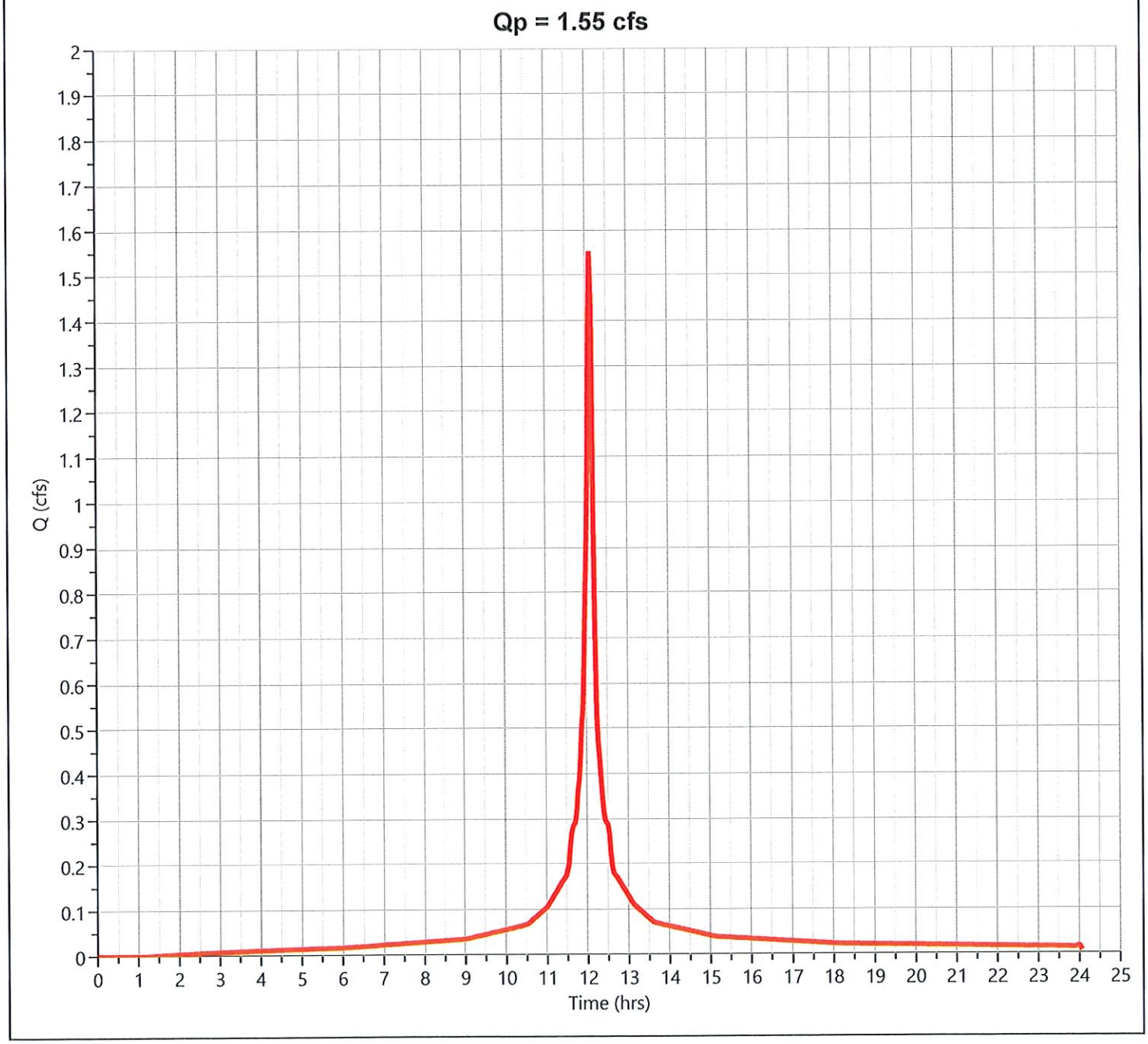
Hydrology Studio v 3.0.0.27

10-16-2023

Post Basin B Impervious

Hyd. No. 16

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.552 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.10 hrs
Time Interval	= 2 min	Runoff Volume	= 4,755 cuft
Drainage Area	= 0.46 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 6.0 min
Total Rainfall	= 3.27 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

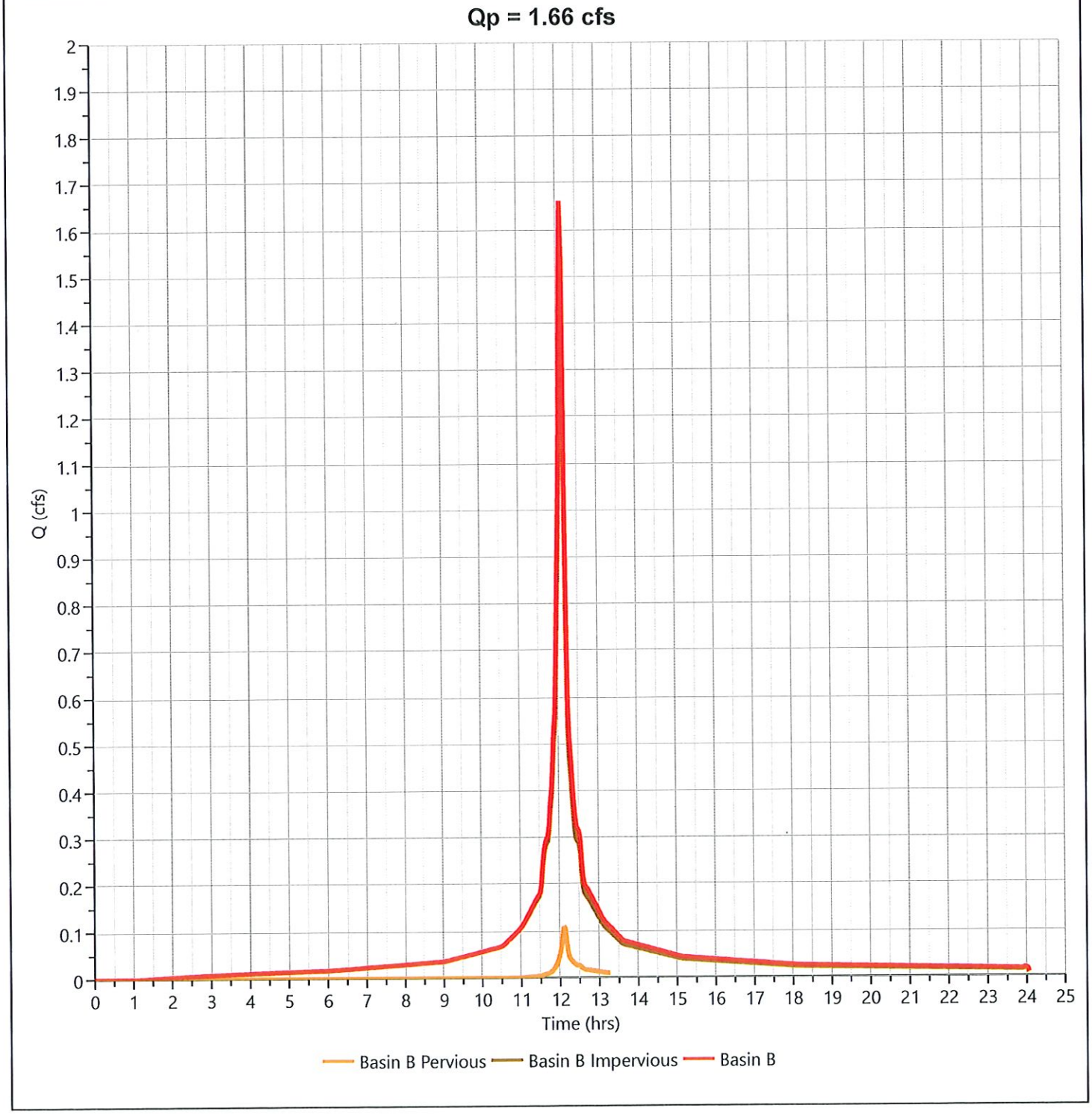
Hydrology Studio v 3.0.0.27

10-16-2023

Post Basin B

Hyd. No. 17

Hydrograph Type	= Junction	Peak Flow	= 1.661 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.10 hrs
Time Interval	= 2 min	Hydrograph Volume	= 5,050 cuft
Inflow Hydrographs	= 15, 16	Total Contrib. Area	= 0.54 ac



Hydrograph Report

Project Name: AN-153

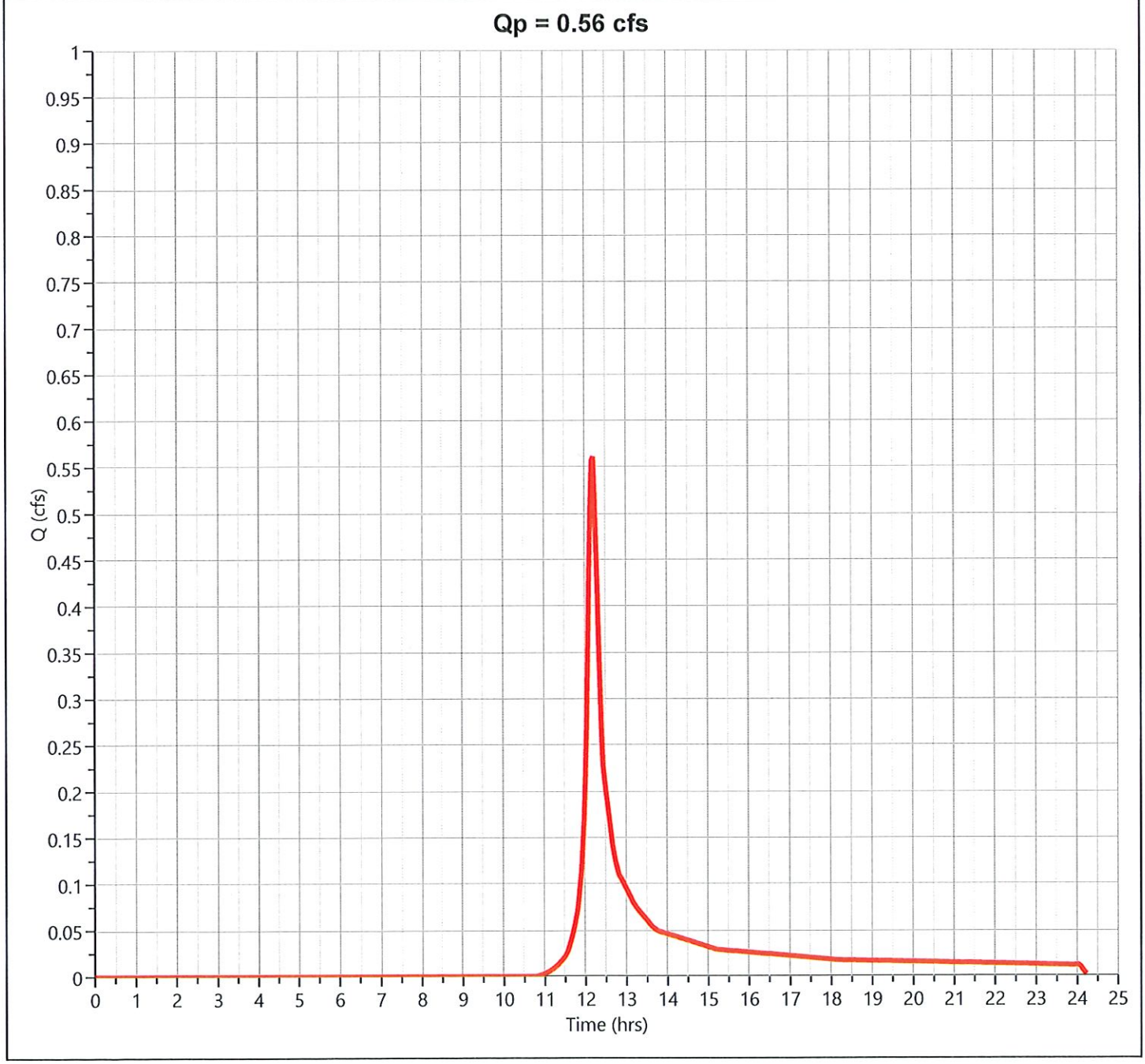
Hydrology Studio v 3.0.0.27

10-16-2023

Post Basin C Pervious

Hyd. No. 18

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.561 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Runoff Volume	= 2,029 cuft
Drainage Area	= 0.5 ac	Curve Number	= 74
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 11.96 min
Total Rainfall	= 3.27 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Tc by TR55 Worksheet

Project Name: AN-153

Hydrology Studio v 3.0.0.27

10-16-2023

Basin C Pervious
NRCS Runoff

Hyd. No. 18

Description	Segments A	B	C	Tc (min)
Sheet Flow				
Description	Grass			
Manning's n	0.150	0.013	0.013	
Flow Length (ft)	100			
2-yr, 24-hr Precip. (in)	2.28	2.28	2.28	
Land Slope (%)	2			
Travel Time (min)	**11.61**	**0.00**	**0.00**	**11.61**
Shallow Concentrated Flow				
Flow Length (ft)	106			
Watercourse Slope (%)	9.67	0.00	0.00	
Surface Description	Unpaved	Paved	Paved	
Average Velocity (ft/s)	5.02			
Travel Time (min)	**0.35**	**0.00**	**0.00**	**0.35**
Channel Flow				
X-sectional Flow Area (sqft)				
Wetted Perimeter (ft)				
Channel Slope (%)				
Manning's n	0.013	0.013	0.013	
Velocity (ft/s)				
Flow Length (ft)				
Travel Time (min)	**0.00**	**0.00**	**0.00**	**0.00**
Total Travel Time				**11.96 min**

Hydrograph Report

Project Name: AN-153

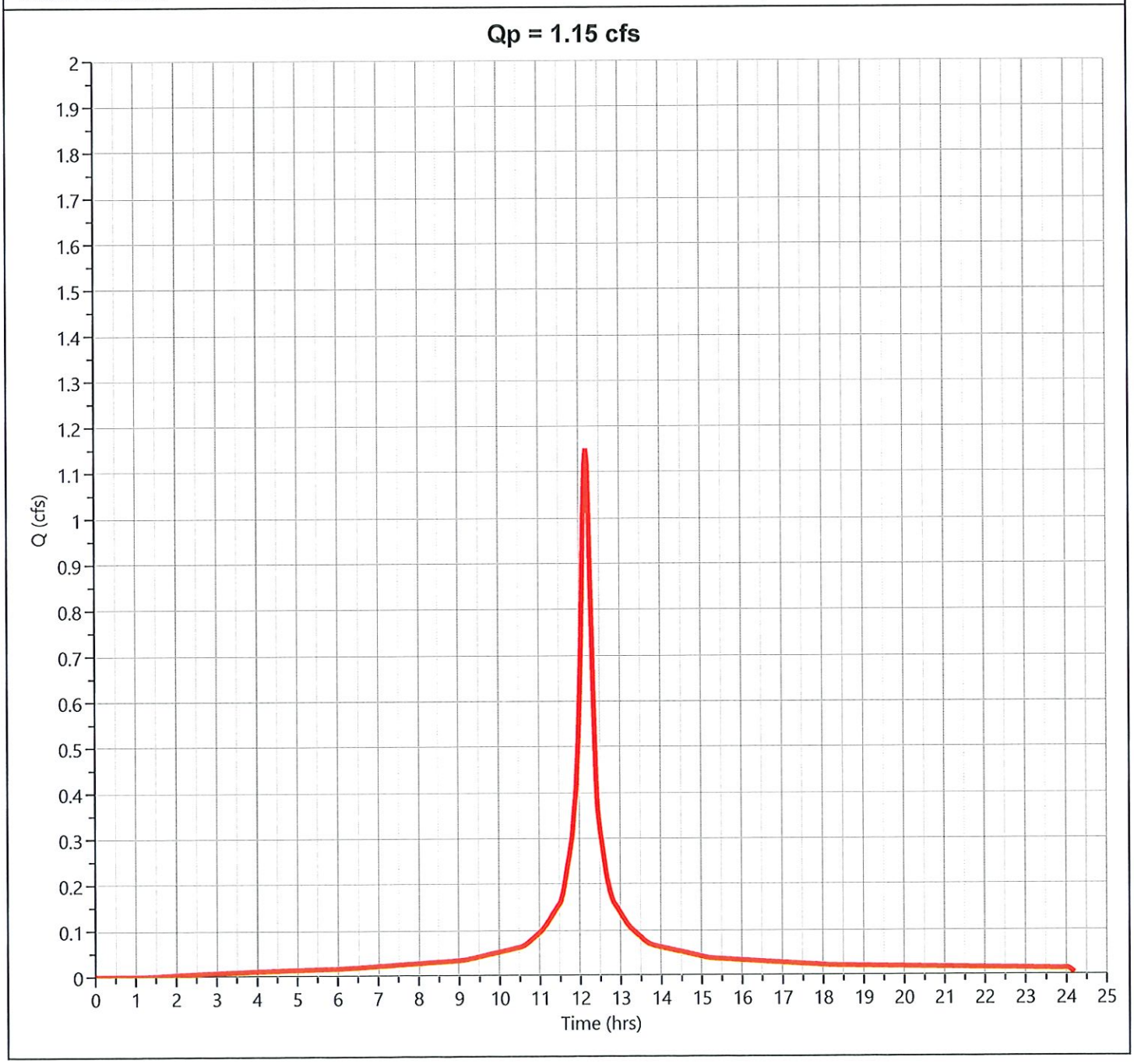
Hydrology Studio v 3.0.0.27

10-16-2023

Post Basin C Impervious

Hyd. No. 19

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.152 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 4,548 cuft
Drainage Area	= 0.4 ac	Curve Number	= 98
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 11.96 min
Total Rainfall	= 3.27 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Tc by TR55 Worksheet

Project Name: AN-153

Hydrology Studio v 3.0.0.27

10-16-2023

Basin C Impervious
NRCS Runoff

Hyd. No. 19

Description	Segments A	Segments B	Segments C	Tc (min)
Sheet Flow				
Description	Grass			
Manning's n	0.150	0.013	0.013	
Flow Length (ft)	100			
2-yr, 24-hr Precip. (in)	2.28	2.28	2.28	
Land Slope (%)	2			
Travel Time (min)	**11.61**	**0.00**	**0.00**	**11.61**
Shallow Concentrated Flow				
Flow Length (ft)	106			
Watercourse Slope (%)	9.67	0.00	0.00	
Surface Description	Unpaved	Paved	Paved	
Average Velocity (ft/s)	5.02			
Travel Time (min)	**0.35**	**0.00**	**0.00**	**0.35**
Channel Flow				
X-sectional Flow Area (sqft)				
Wetted Perimeter (ft)				
Channel Slope (%)				
Manning's n	0.013	0.013	0.013	
Velocity (ft/s)				
Flow Length (ft)				
Travel Time (min)	**0.00**	**0.00**	**0.00**	**0.00**
Total Travel Time				**11.96 min**

Hydrograph Report

Project Name: AN-153

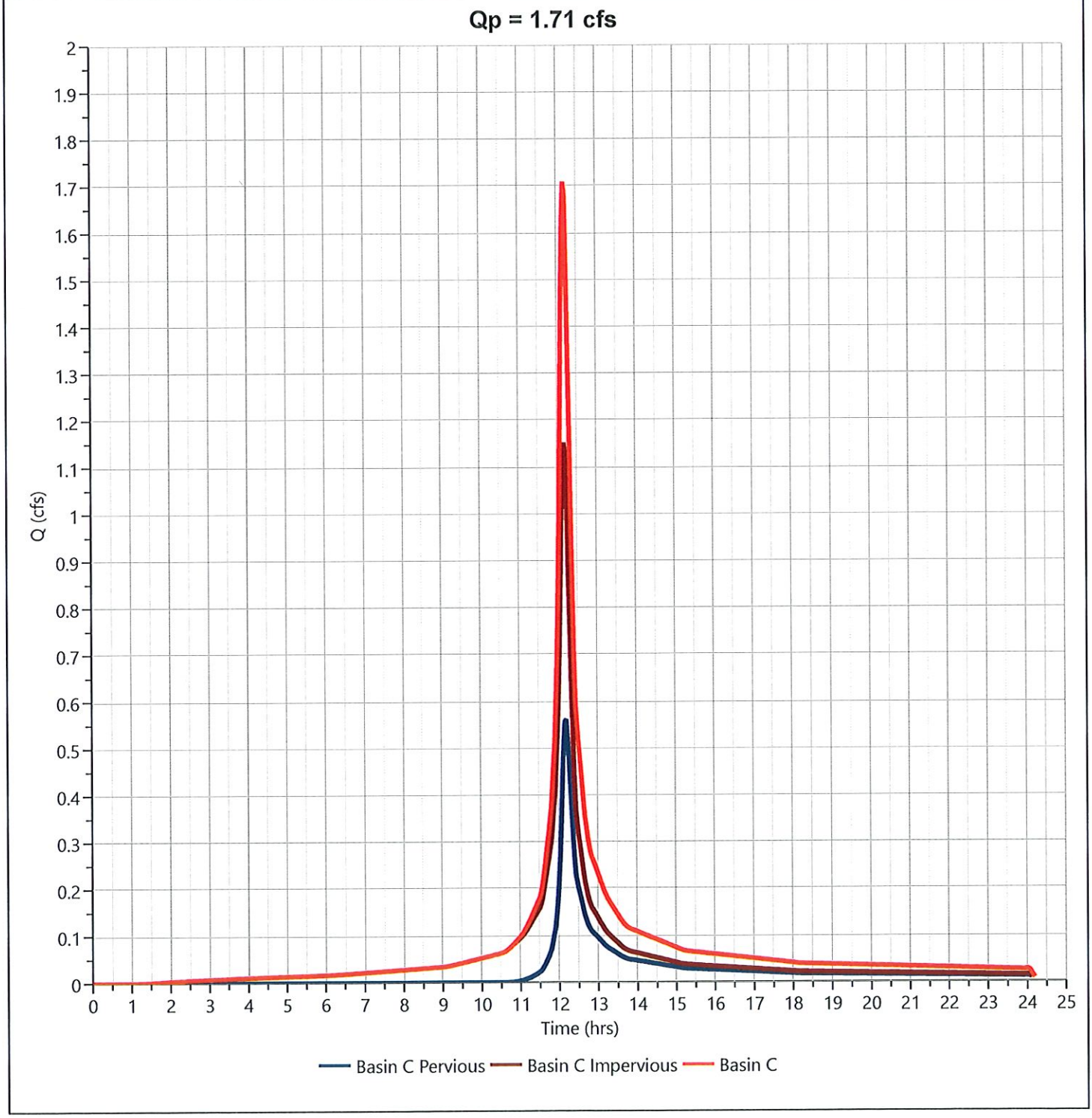
Hydrology Studio v 3.0.0.27

10-16-2023

Post Basin C

Hyd. No. 20

Hydrograph Type	= Junction	Peak Flow	= 1.709 cfs
Storm Frequency	= 2-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 6,577 cuft
Inflow Hydrographs	= 18, 19	Total Contrib. Area	= 0.9 ac



Hydrograph 10-yr Summary

Project Name: AN-153

10-16-2023

Hydrology Studio v 3.0.0.27

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (hrs)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	NRCS Runoff	Pre Basin A Pervious	0.867	12.20	3,085	----		
2	NRCS Runoff	Pre Basin A Impervious	9.747	12.17	39,107	----		
3	Junction	Pre Basin A	10.61	12.17	42,192	1, 2		
4	NRCS Runoff	Pre Basin B	2.989	12.10	9,308	----		
5	NRCS Runoff	Pre Basin C Pervious	0.572	12.17	2,006	----		
6	NRCS Runoff	Pre Basin C Impervious	3.472	12.17	13,931	----		
7	Junction	Pre Basin C	4.044	12.17	15,936	5, 6		
8	NRCS Runoff	Post Basin A Pervious	0.973	12.17	3,449	----		
9	NRCS Runoff	Post Basin A Impervious	2.468	12.17	9,903	----		
10	NRCS Runoff	Post A Pervious (Pond)	1.236	12.17	4,332	----		
11	NRCS Runoff	Post A Impervious (Pond)	5.689	12.17	22,826	----		
12	Junction	Post Basin A (Pond)	6.925	12.17	27,159	10, 11		
13	Pond Route	Pond A1	4.188	12.30	6,028	12	608.29	9,142
14	Junction	Post Basin A	6.592	12.27	19,380	8, 9, 13		
15	NRCS Runoff	Post Basin B Pervious	0.220	12.10	583	----		
16	NRCS Runoff	Post Basin B Impervious	2.254	12.10	7,019	----		
17	Junction	Post Basin B	2.474	12.10	7,602	15, 16		
18	NRCS Runoff	Post Basin C Pervious	1.144	12.17	4,011	----		
19	NRCS Runoff	Post Basin C Impervious	1.673	12.17	6,714	----		
20	Junction	Post Basin C	2.817	12.17	10,725	18, 19		

Hydrograph Report

Project Name: AN-153

Hydrology Studio v 3.0.0.27

10-16-2023

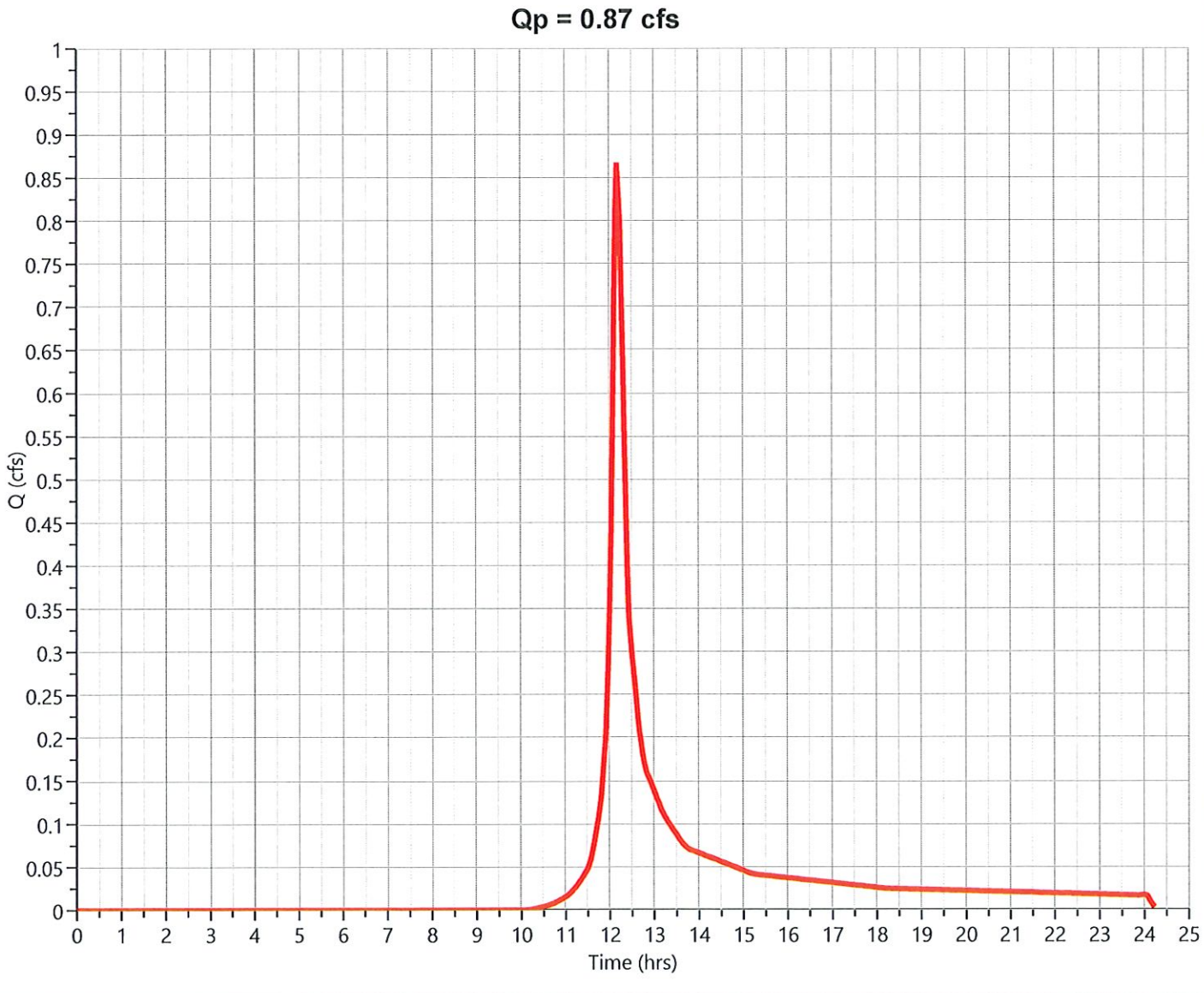
Pre Basin A Pervious

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.867 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Runoff Volume	= 3,085 cuft
Drainage Area	= 0.45 ac	Curve Number	= 70*
Tc Method	= User	Time of Conc. (Tc)	= 12.04 min
Total Rainfall	= 4.72 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.41	70	Woods, Good Condition
0.04	74	Open Space, Good Condition
0.45	**70**	Weighted CN Method Employed



Hydrograph Report

Project Name: AN-153

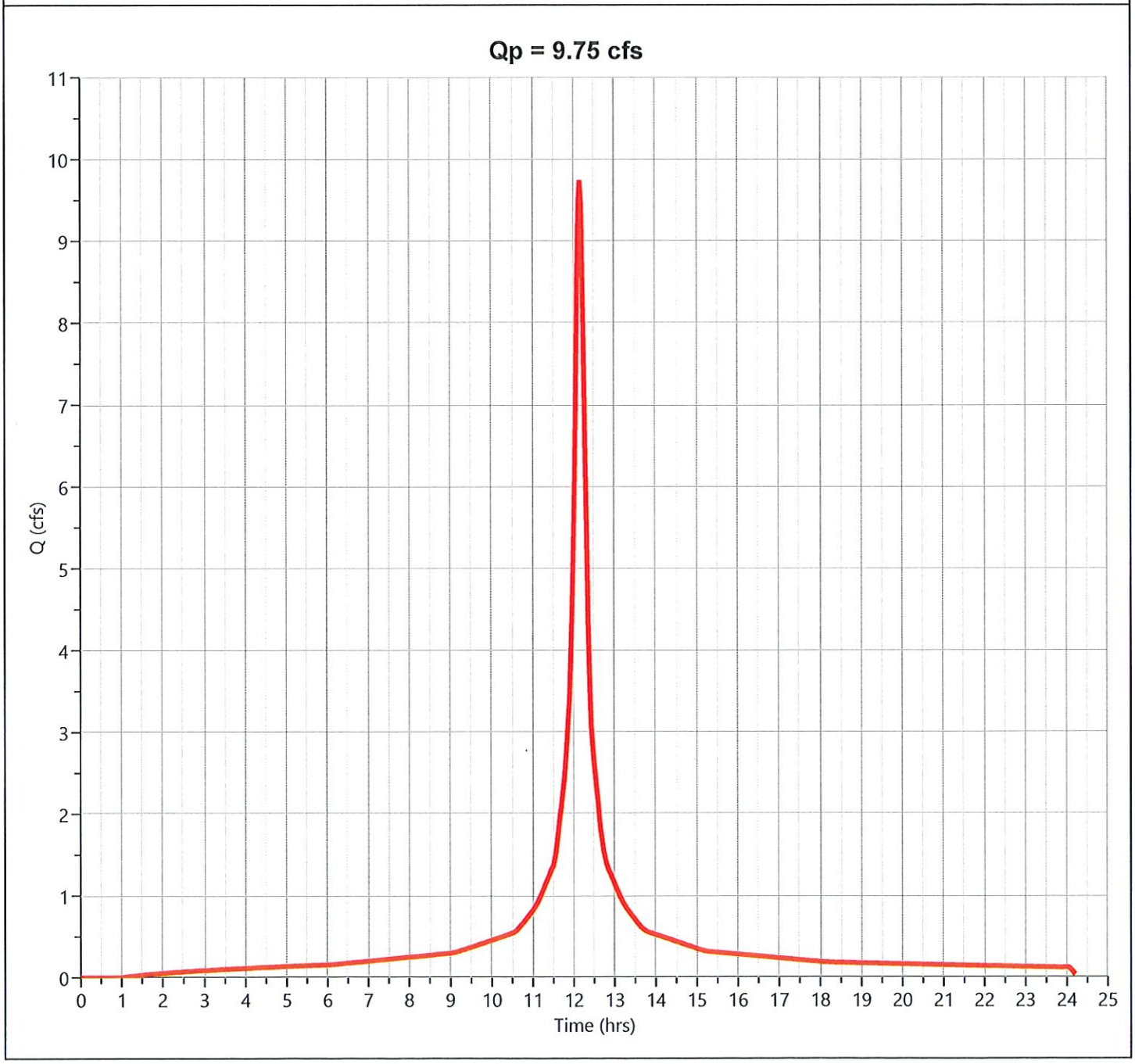
Hydrology Studio v 3.0.0.27

10-16-2023

Pre Basin A Impervious

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 9.747 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 39,107 cuft
Drainage Area	= 2.33 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 12.04 min
Total Rainfall	= 4.72 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

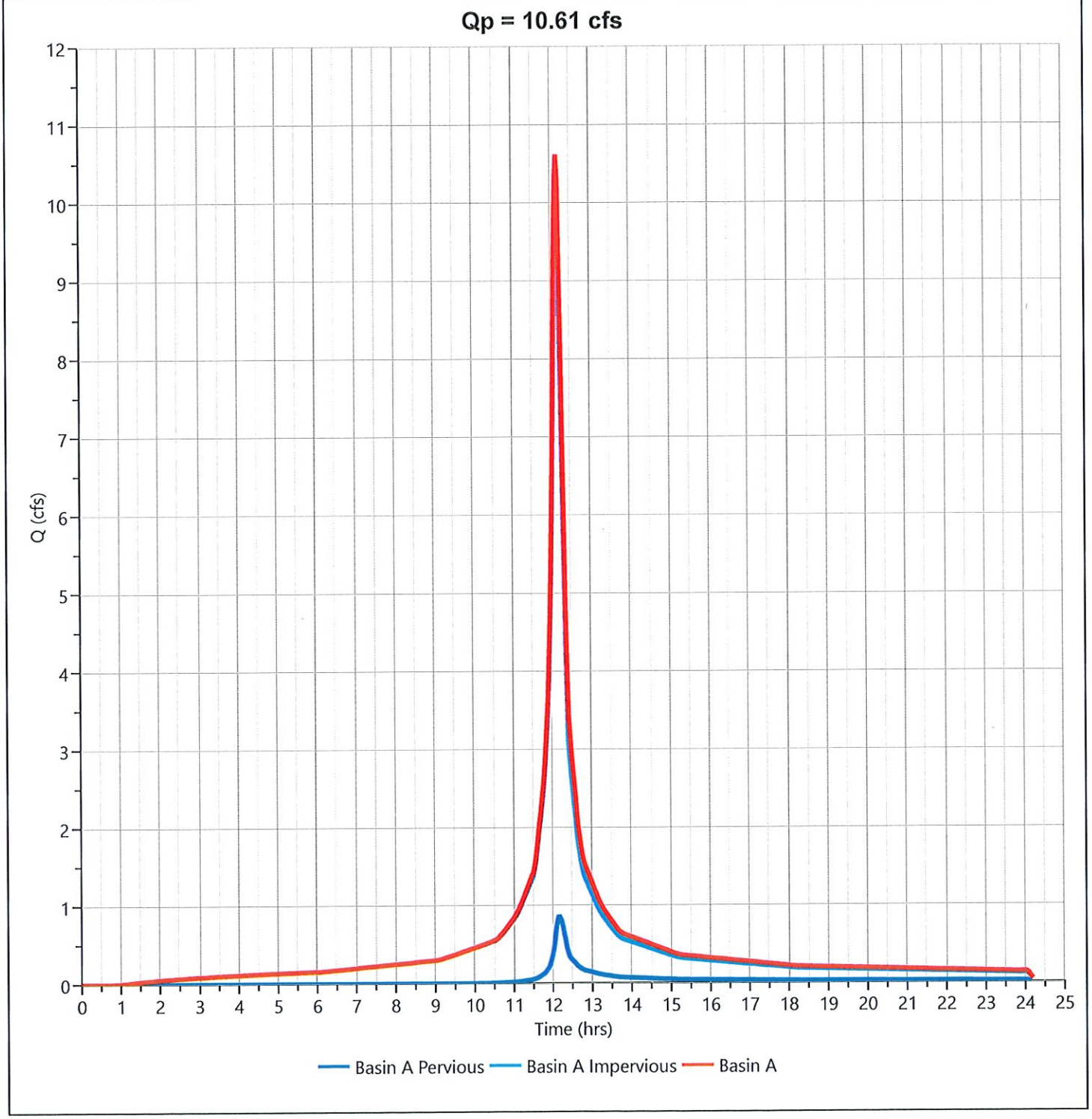
Hydrology Studio v 3.0.0.27

10-16-2023

Pre Basin A

Hyd. No. 3

Hydrograph Type	= Junction	Peak Flow	= 10.61 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 42,192 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 2.78 ac



Hydrograph Report

Project Name: AN-153

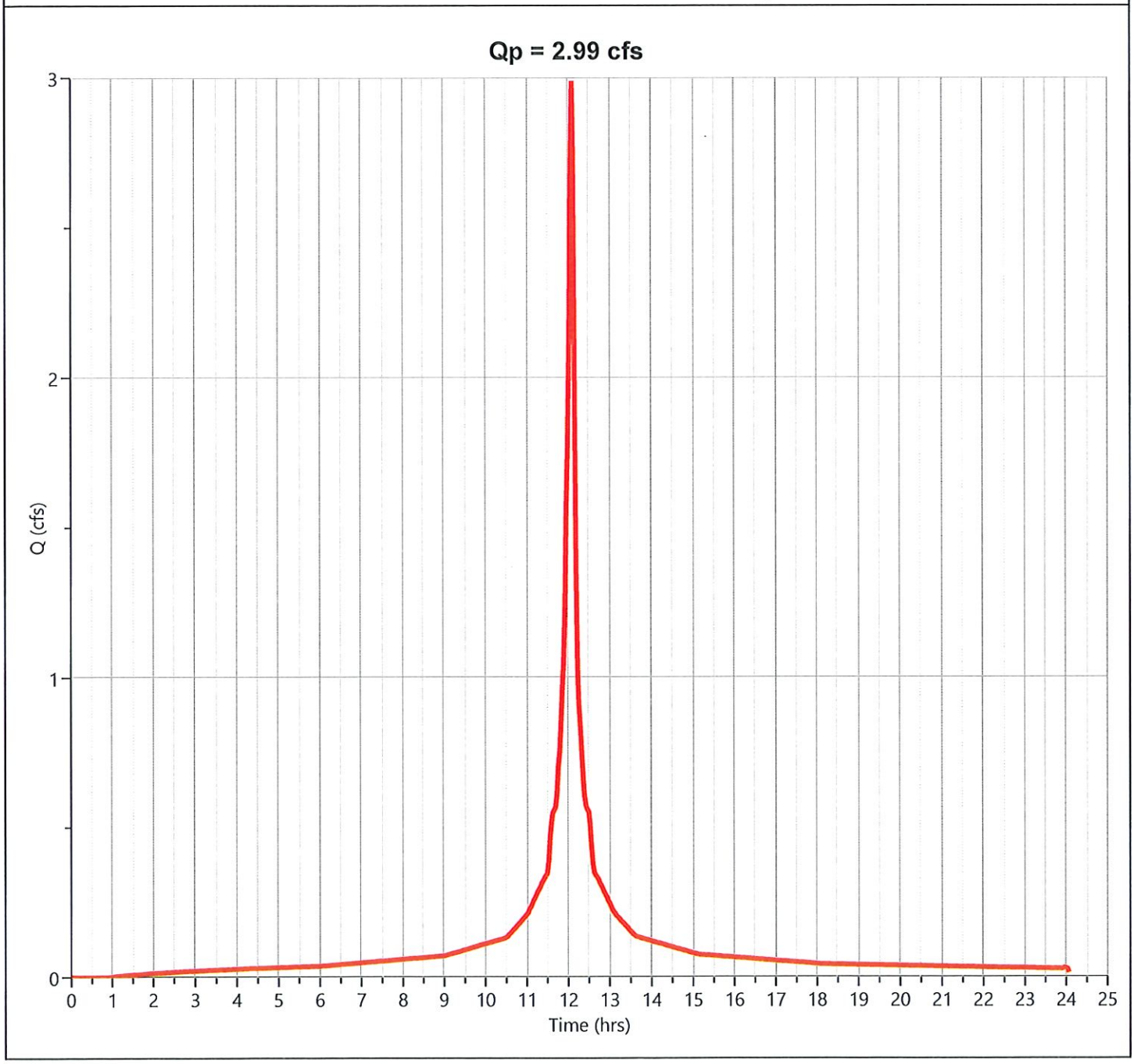
Hydrology Studio v 3.0.0.27

10-16-2023

Pre Basin B

Hyd. No. 4

Hydrograph Type	= NRCS Runoff	Peak Flow	= 2.989 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.10 hrs
Time Interval	= 2 min	Runoff Volume	= 9,308 cuft
Drainage Area	= 0.61 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 6.0 min
Total Rainfall	= 4.72 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

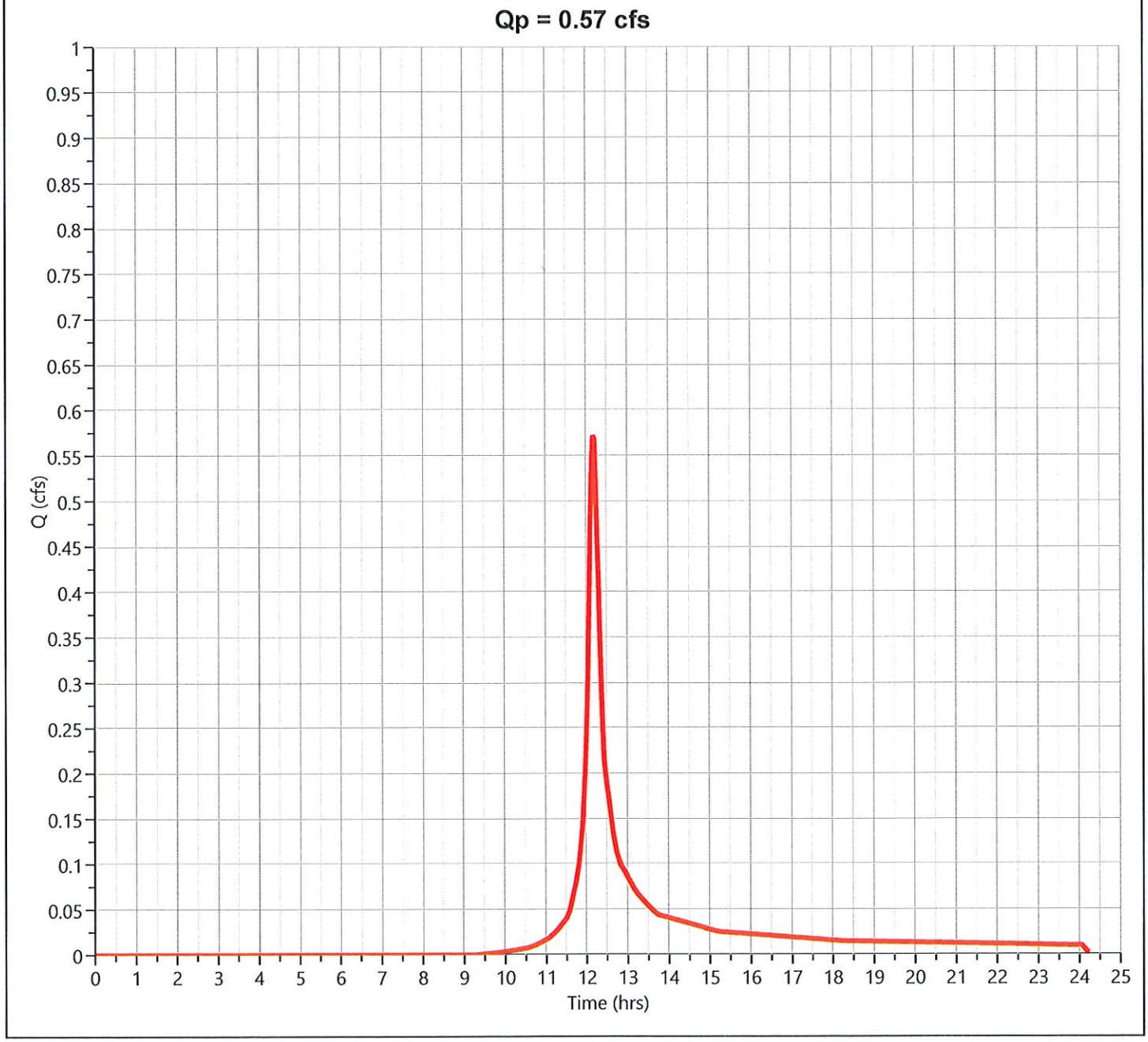
Hydrology Studio v 3.0.0.27

10-16-2023

Pre Basin C Pervious

Hyd. No. 5

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.572 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 2,006 cuft
Drainage Area	= 0.25 ac	Curve Number	= 74
Tc Method	= User	Time of Conc. (Tc)	= 10.24 min
Total Rainfall	= 4.72 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

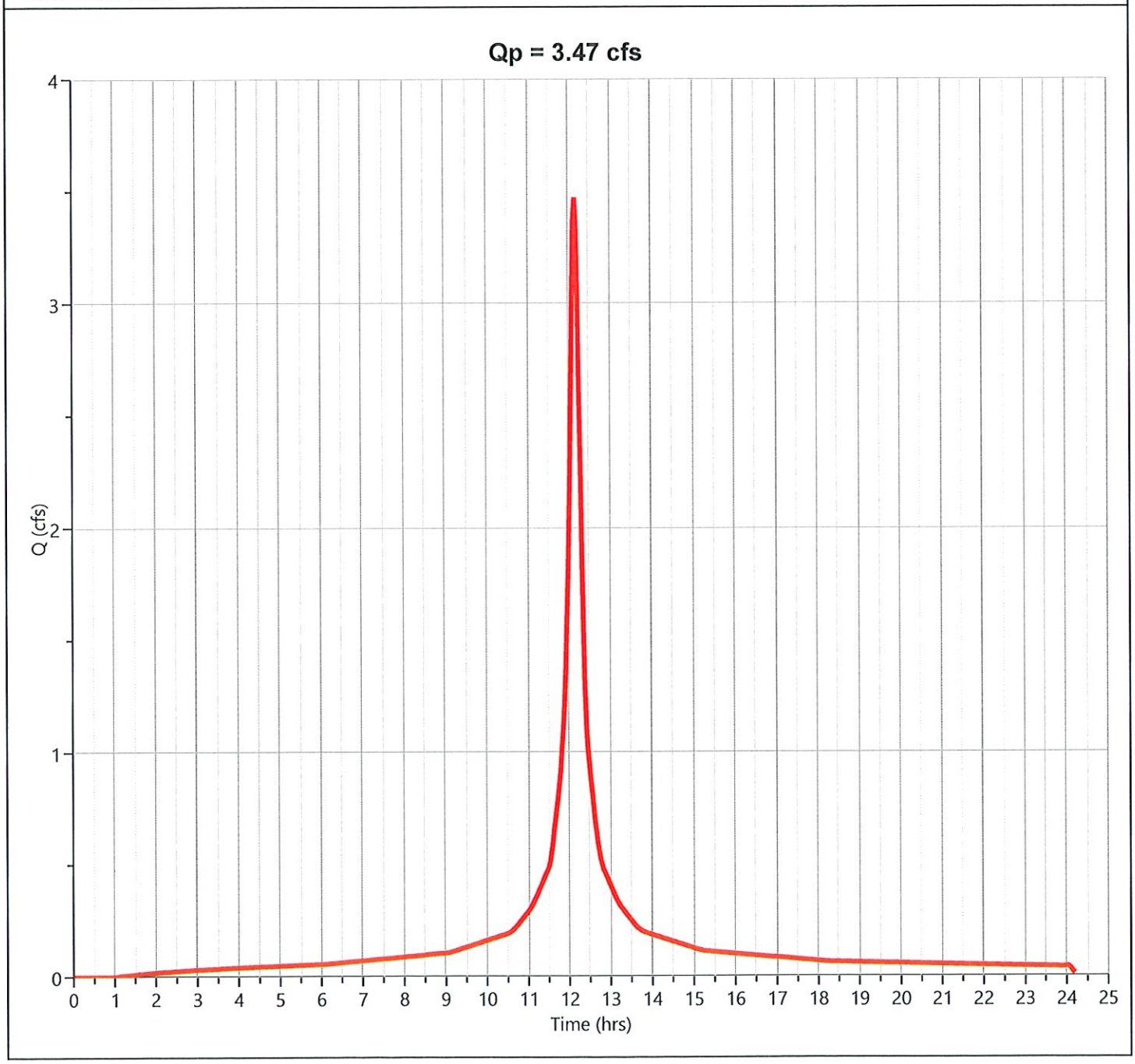
Hydrology Studio v 3.0.0.27

10-16-2023

Pre Basin C Impervious

Hyd. No. 6

Hydrograph Type	= NRCS Runoff	Peak Flow	= 3.472 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 13,931 cuft
Drainage Area	= 0.83 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 10.24 min
Total Rainfall	= 4.72 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

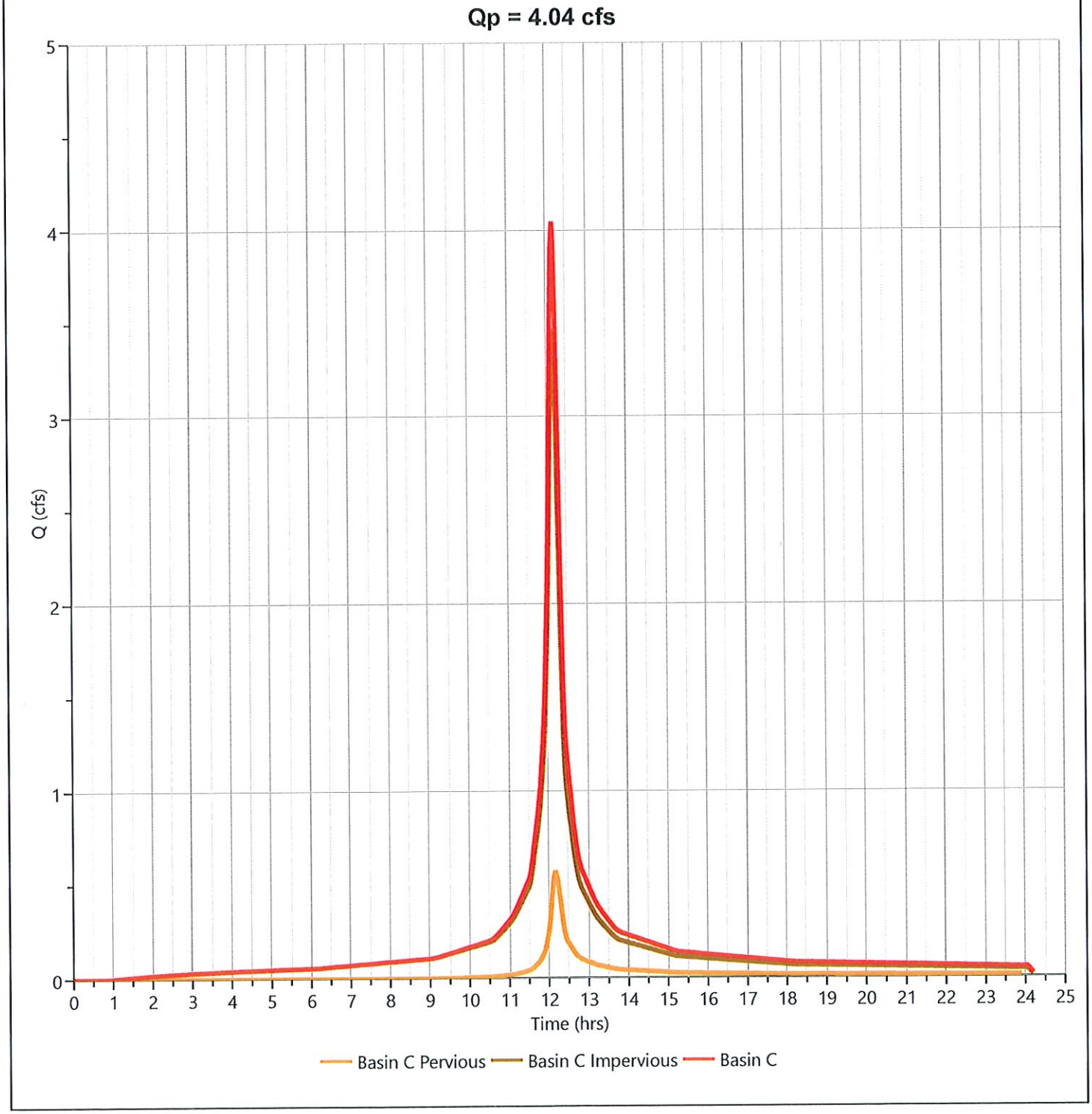
Hydrology Studio v 3.0.0.27

10-16-2023

Pre Basin C

Hyd. No. 7

Hydrograph Type	= Junction	Peak Flow	= 4.044 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 15,936 cuft
Inflow Hydrographs	= 5, 6	Total Contrib. Area	= 1.08 ac



Hydrograph Report

Project Name: AN-153

Hydrology Studio v 3.0.0.27

10-16-2023

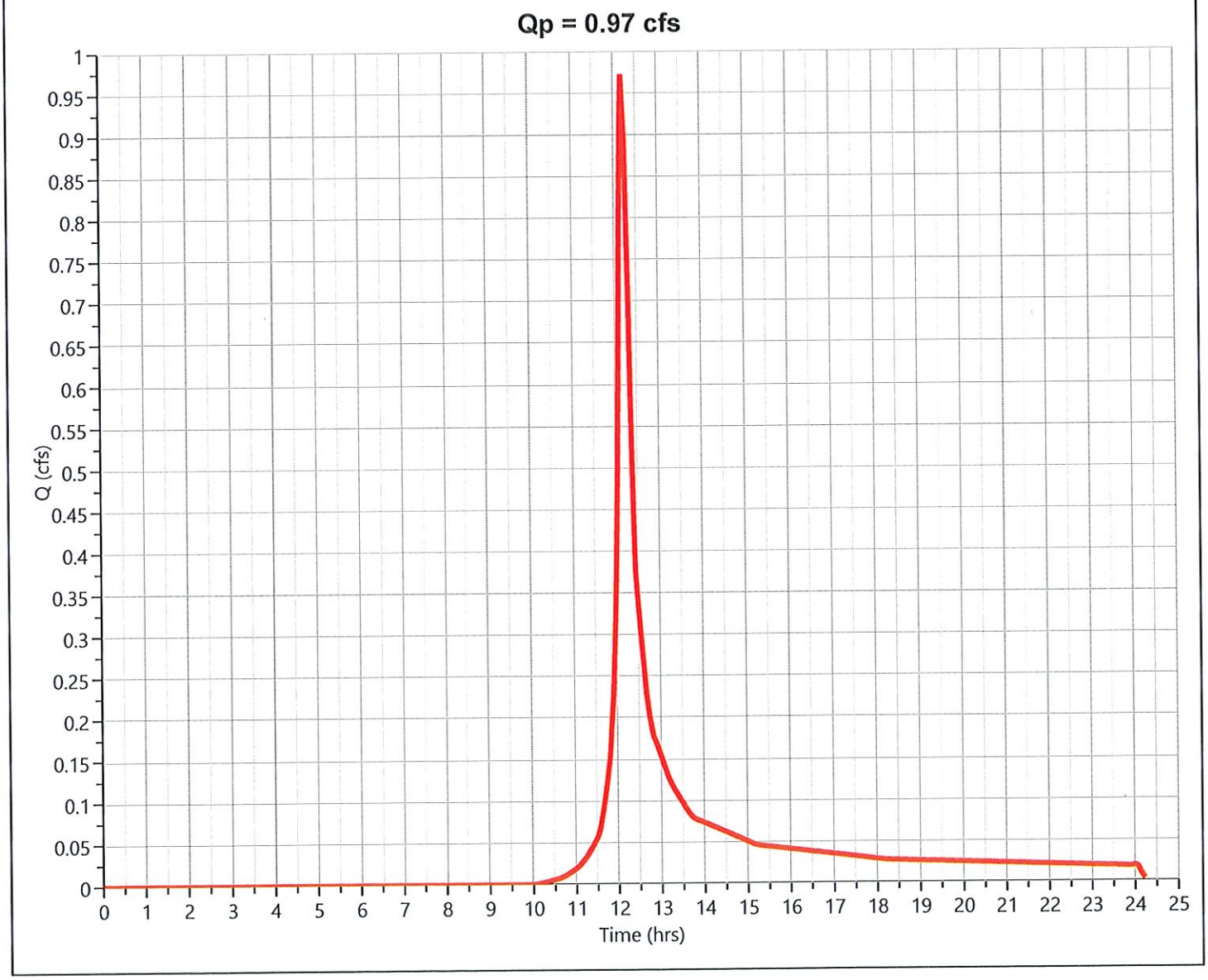
Post Basin A Pervious

Hyd. No. 8

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.973 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 3,449 cuft
Drainage Area	= 0.49 ac	Curve Number	= 70.65*
Tc Method	= User	Time of Conc. (Tc)	= 12.3 min
Total Rainfall	= 4.72 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.41	70	Woods, Good
0.08	74	Open Space, Good
0.49	**71**	Weighted CN Method Employed



Hydrograph Report

Project Name: AN-153

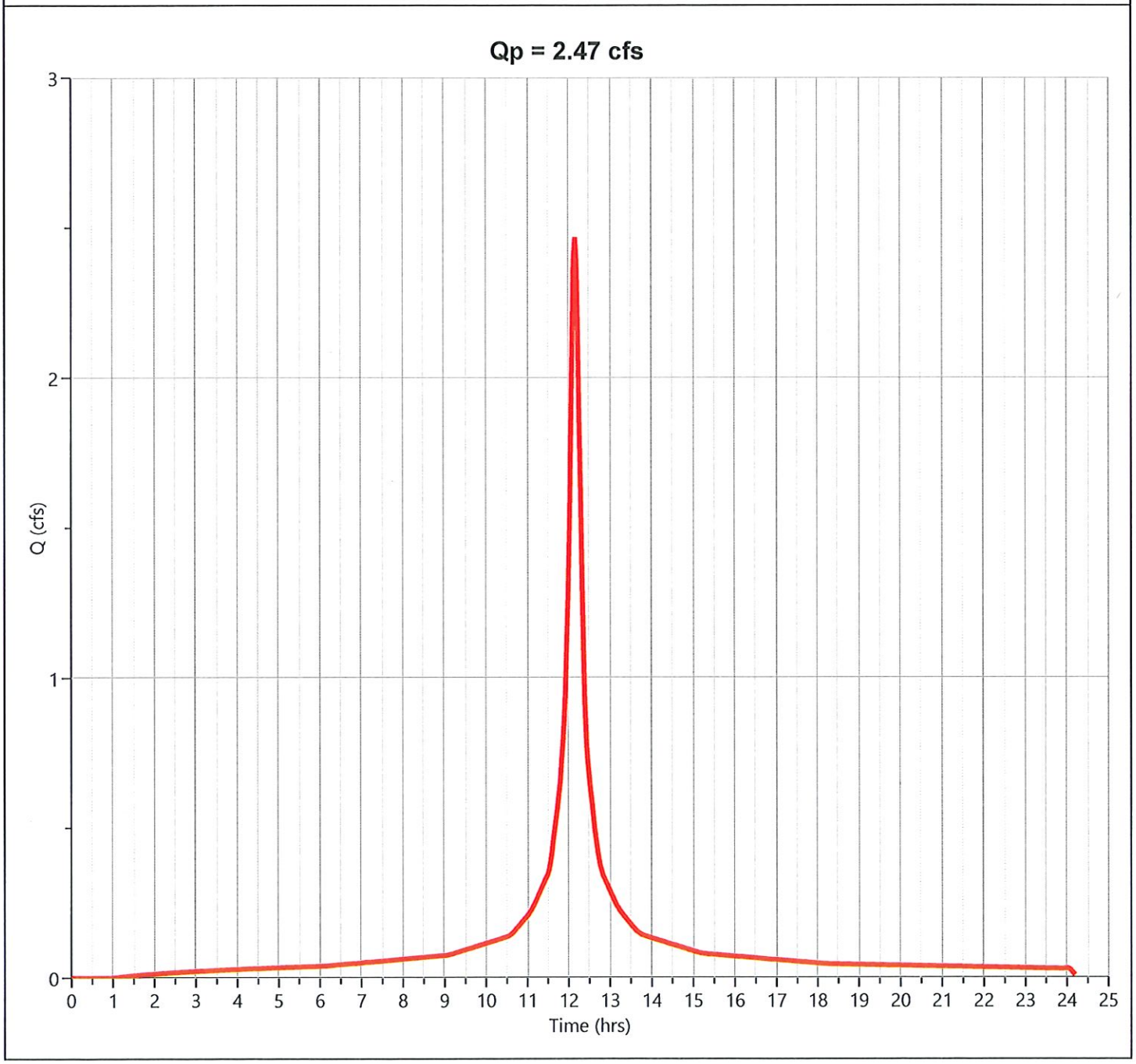
Hydrology Studio v 3.0.0.27

10-16-2023

Post Basin A Impervious

Hyd. No. 9

Hydrograph Type	= NRCS Runoff	Peak Flow	= 2.468 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 9,903 cuft
Drainage Area	= 0.59 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 12.3 min
Total Rainfall	= 4.72 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

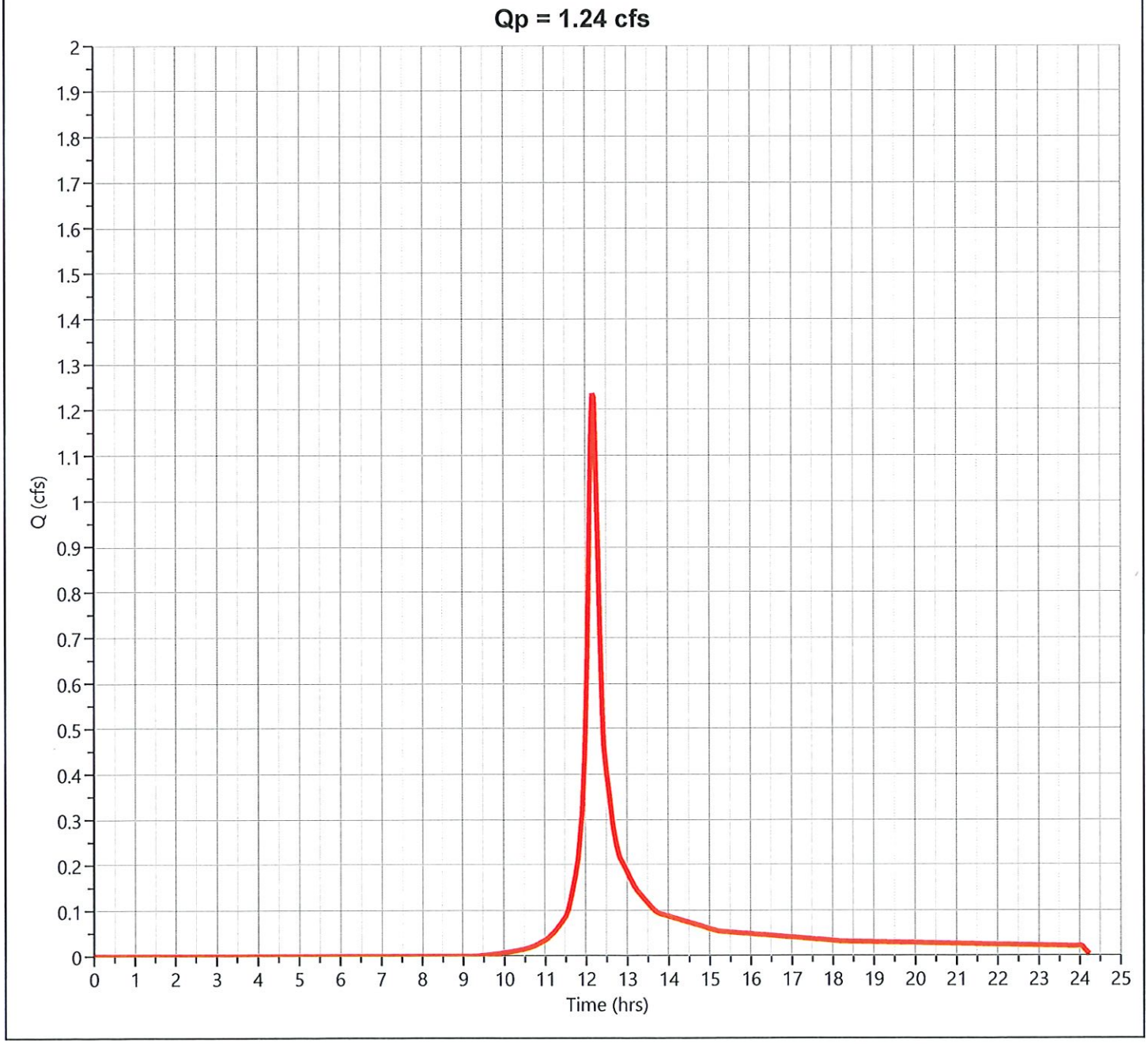
Hydrology Studio v 3.0.0.27

10-16-2023

Post A Pervious (Pond)

Hyd. No. 10

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.236 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 4,332 cuft
Drainage Area	= 0.54 ac	Curve Number	= 74
Tc Method	= User	Time of Conc. (Tc)	= 12.3 min
Total Rainfall	= 4.72 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

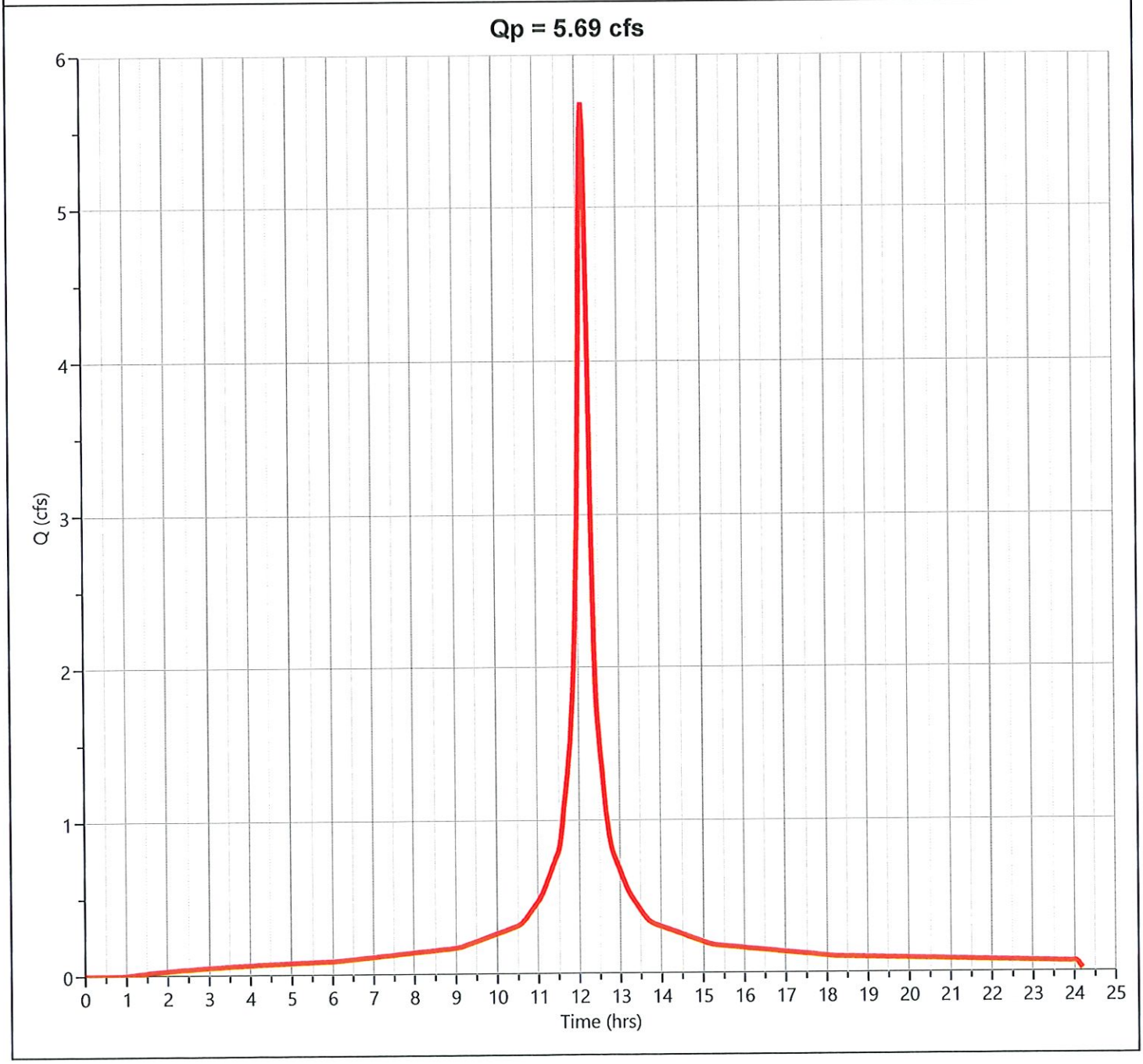
Hydrology Studio v 3.0.0.27

10-16-2023

Post A Impervious (Pond)

Hyd. No. 11

Hydrograph Type	= NRCS Runoff	Peak Flow	= 5.689 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 22,826 cuft
Drainage Area	= 1.36 ac	Curve Number	= 98
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 12.3 min
Total Rainfall	= 4.72 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

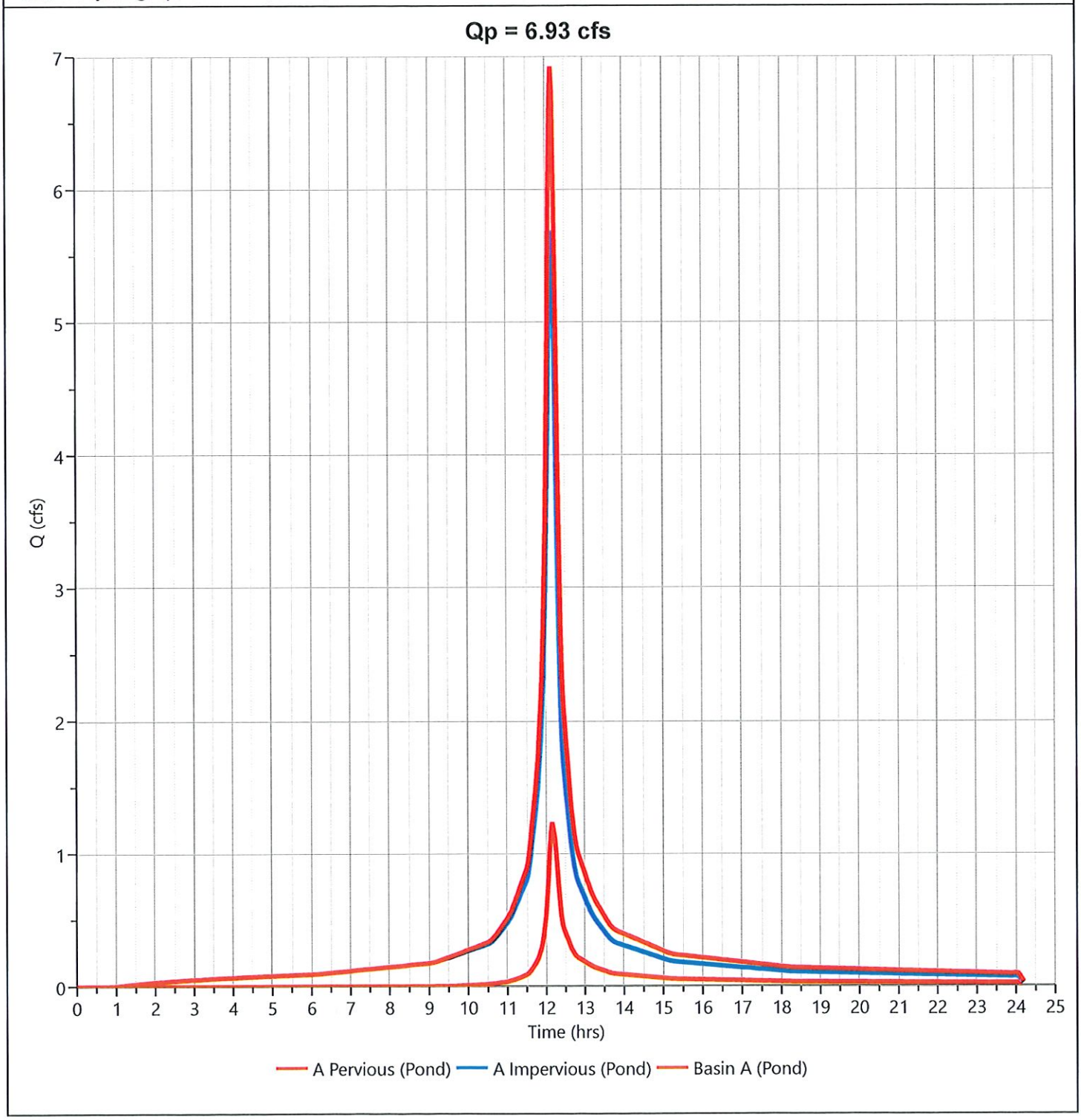
Hydrology Studio v 3.0.0.27

10-16-2023

Post Basin A (Pond)

Hyd. No. 12

Hydrograph Type	= Junction	Peak Flow	= 6.925 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 27,159 cuft
Inflow Hydrographs	= 10, 11	Total Contrib. Area	= 1.9 ac



Hydrograph Report

Project Name: AN-153

Hydrology Studio v 3.0.0.27

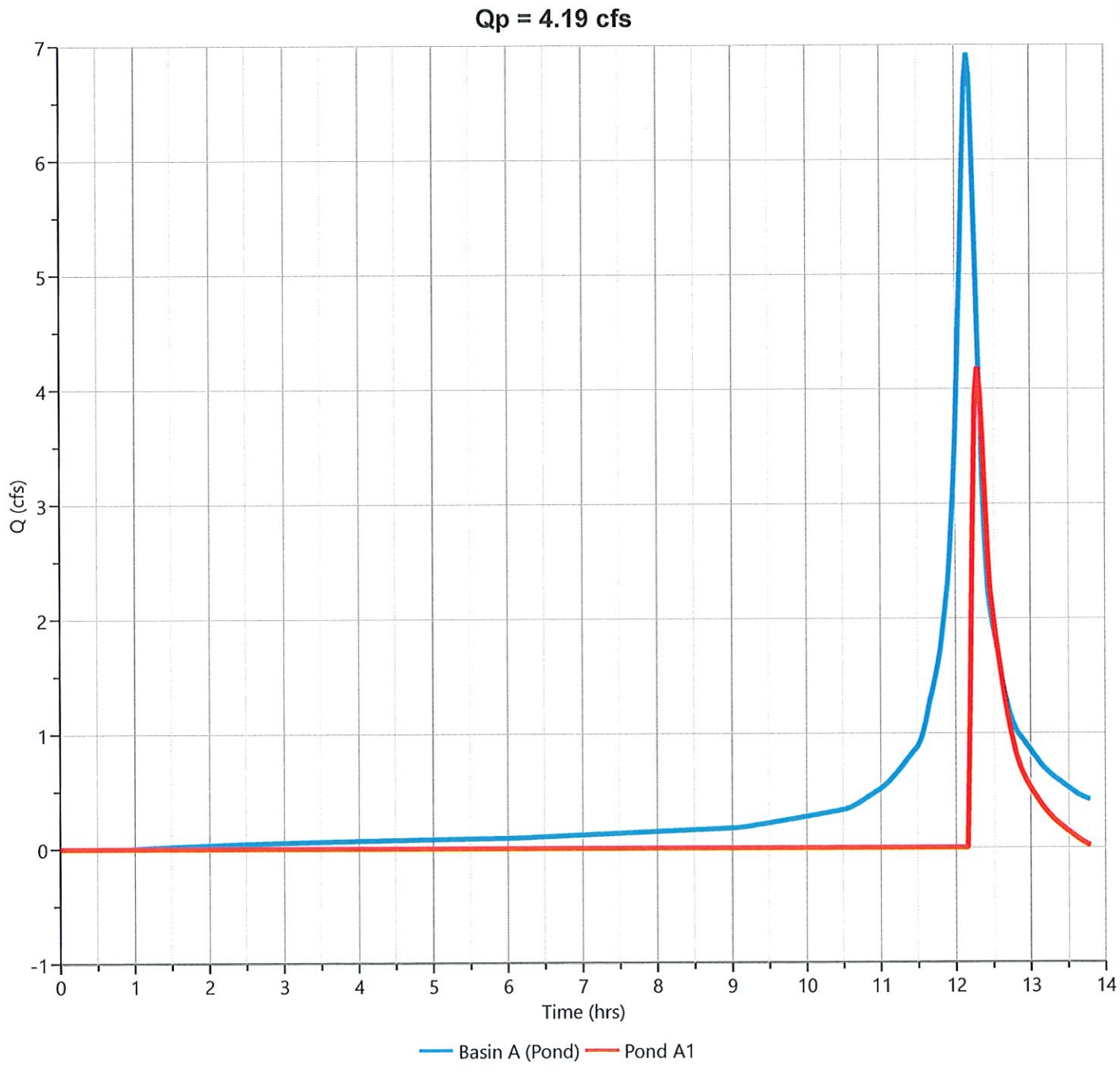
10-16-2023

Pond A1

Hyd. No. 13

Hydrograph Type	= Pond Route	Peak Flow	= 4.188 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.30 hrs
Time Interval	= 2 min	Hydrograph Volume	= 6,028 cuft
Inflow Hydrograph	= 12 - Basin A (Pond)	Max. Elevation	= 608.29 ft
Pond Name	= Pond A	Max. Storage	= 9,142 cuft

Pond Routing by Storage Indication Method



Hydrograph Report

Project Name: AN-153

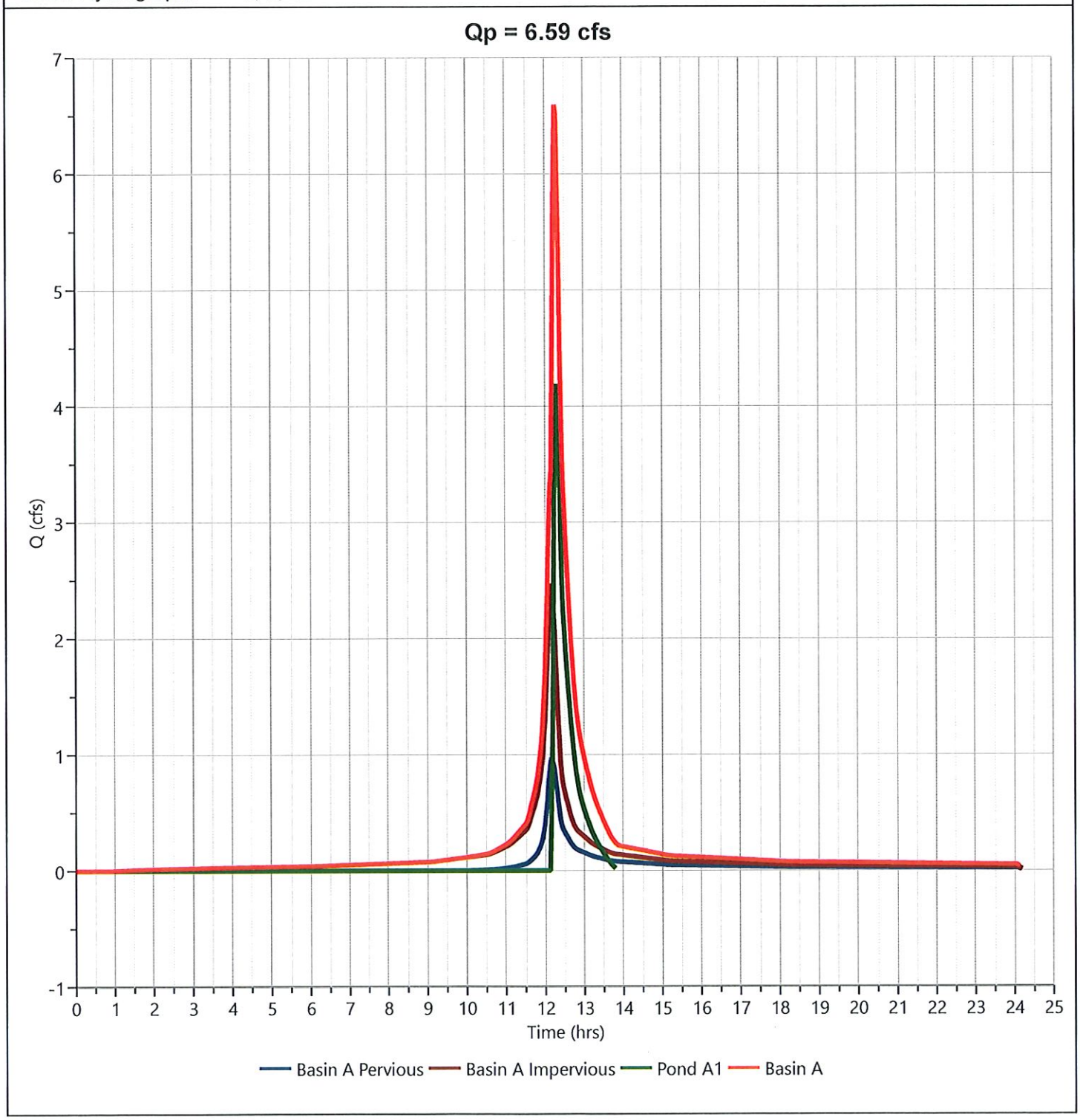
Hydrology Studio v 3.0.0.27

10-16-2023

Post Basin A

Hyd. No. 14

Hydrograph Type	= Junction	Peak Flow	= 6.592 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.27 hrs
Time Interval	= 2 min	Hydrograph Volume	= 19,380 cuft
Inflow Hydrographs	= 8, 9, 13	Total Contrib. Area	= 1.08 ac



Hydrograph Report

Project Name: AN-153

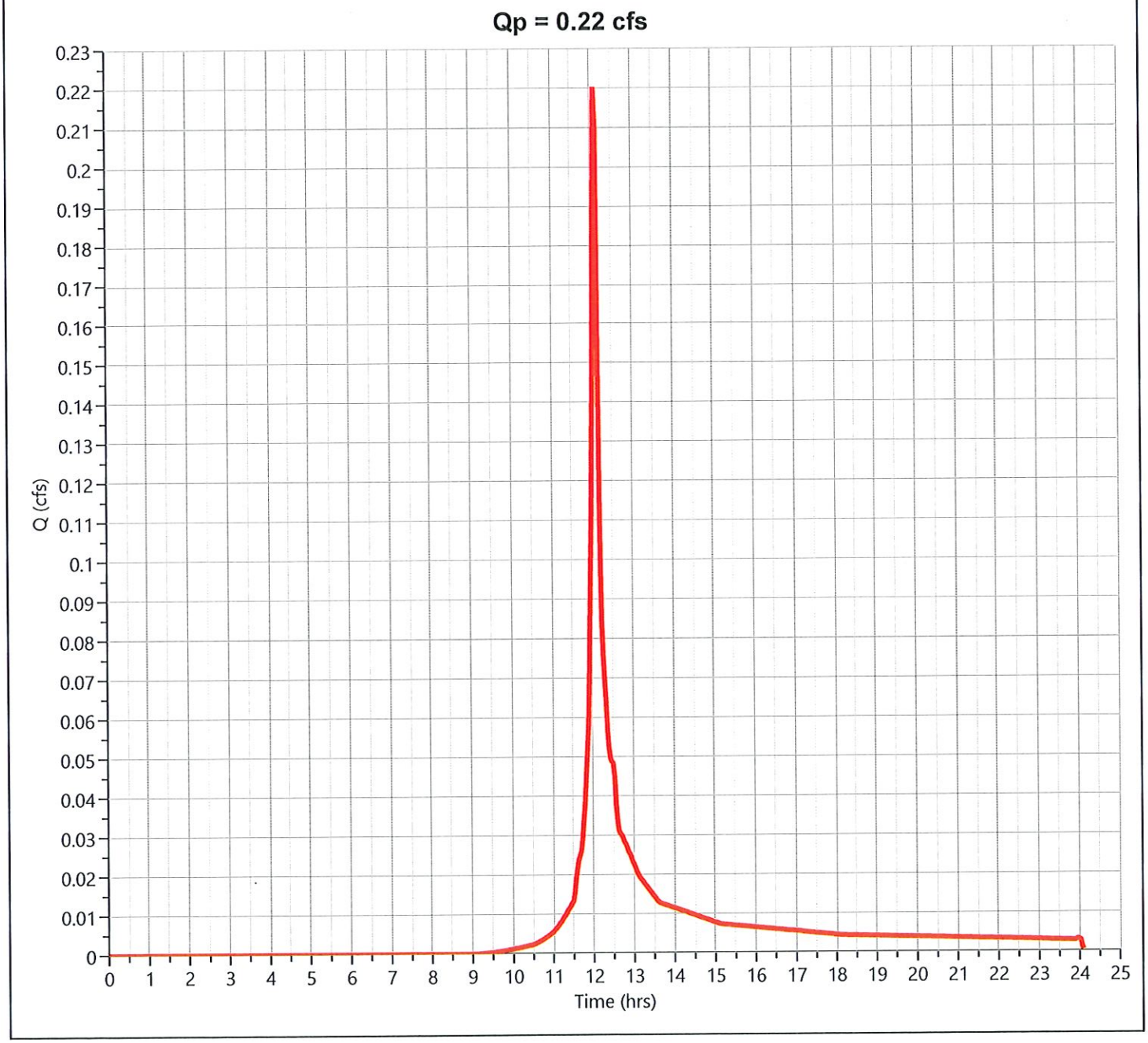
Hydrology Studio v 3.0.0.27

10-16-2023

Post Basin B Pervious

Hyd. No. 15

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.220 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.10 hrs
Time Interval	= 2 min	Runoff Volume	= 583 cuft
Drainage Area	= 0.08 ac	Curve Number	= 74
Tc Method	= User	Time of Conc. (Tc)	= 6.0 min
Total Rainfall	= 4.72 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

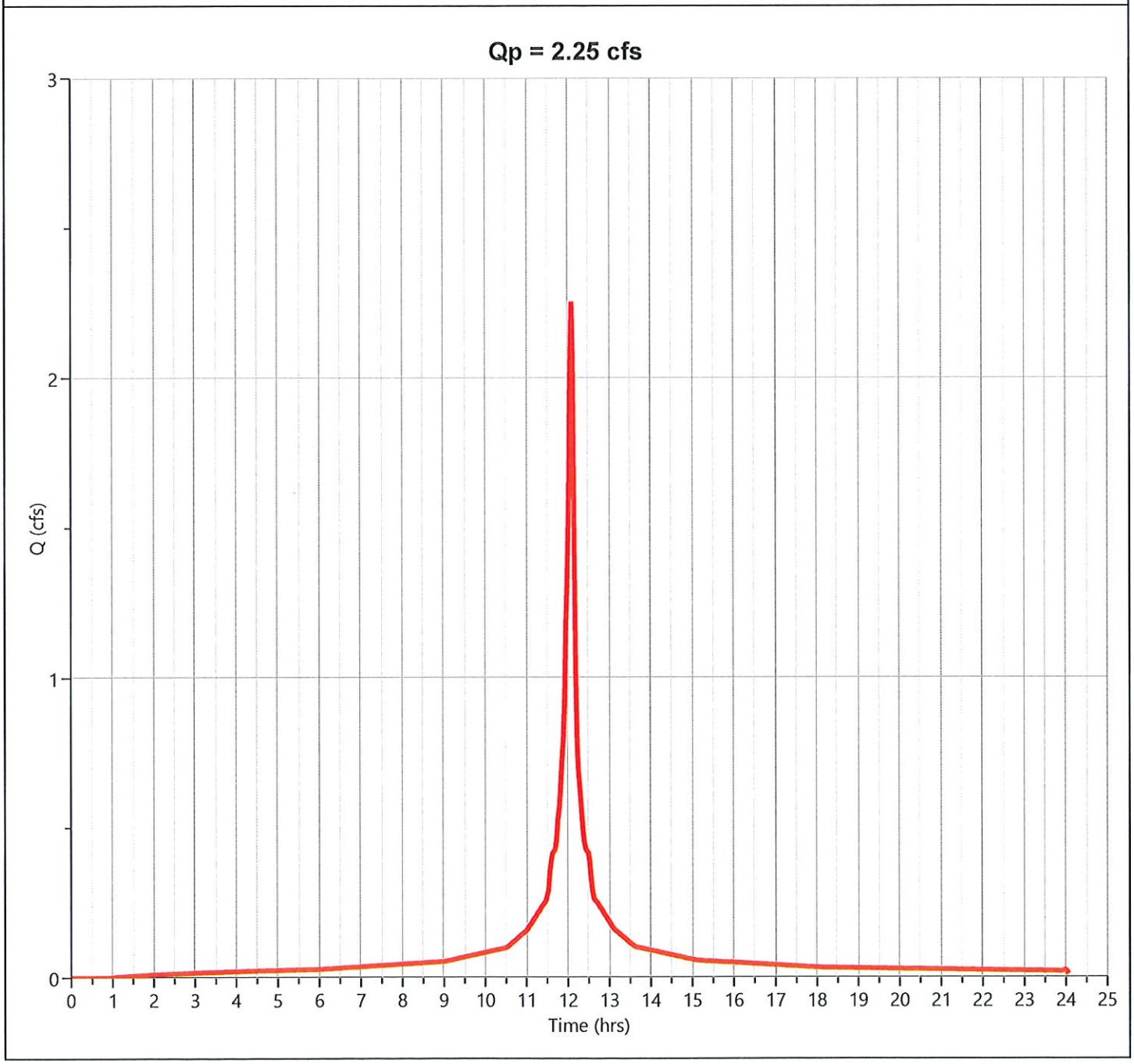
Hydrology Studio v 3.0.0.27

10-16-2023

Post Basin B Impervious

Hyd. No. 16

Hydrograph Type	= NRCS Runoff	Peak Flow	= 2.254 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.10 hrs
Time Interval	= 2 min	Runoff Volume	= 7,019 cuft
Drainage Area	= 0.46 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 6.0 min
Total Rainfall	= 4.72 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

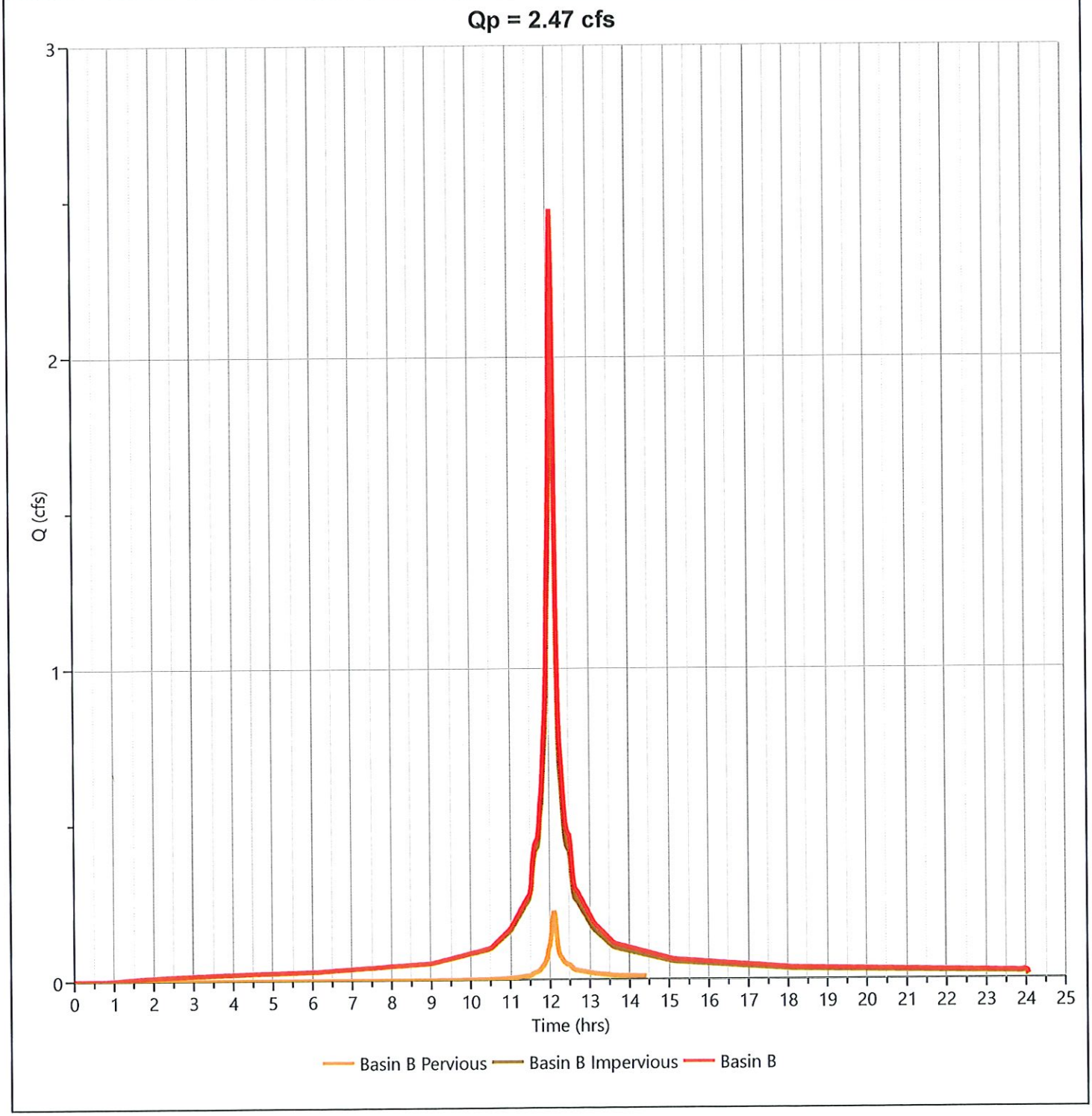
Hydrology Studio v 3.0.0.27

10-16-2023

Post Basin B

Hyd. No. 17

Hydrograph Type	= Junction	Peak Flow	= 2.474 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.10 hrs
Time Interval	= 2 min	Hydrograph Volume	= 7,602 cuft
Inflow Hydrographs	= 15, 16	Total Contrib. Area	= 0.54 ac



Hydrograph Report

Project Name: AN-153

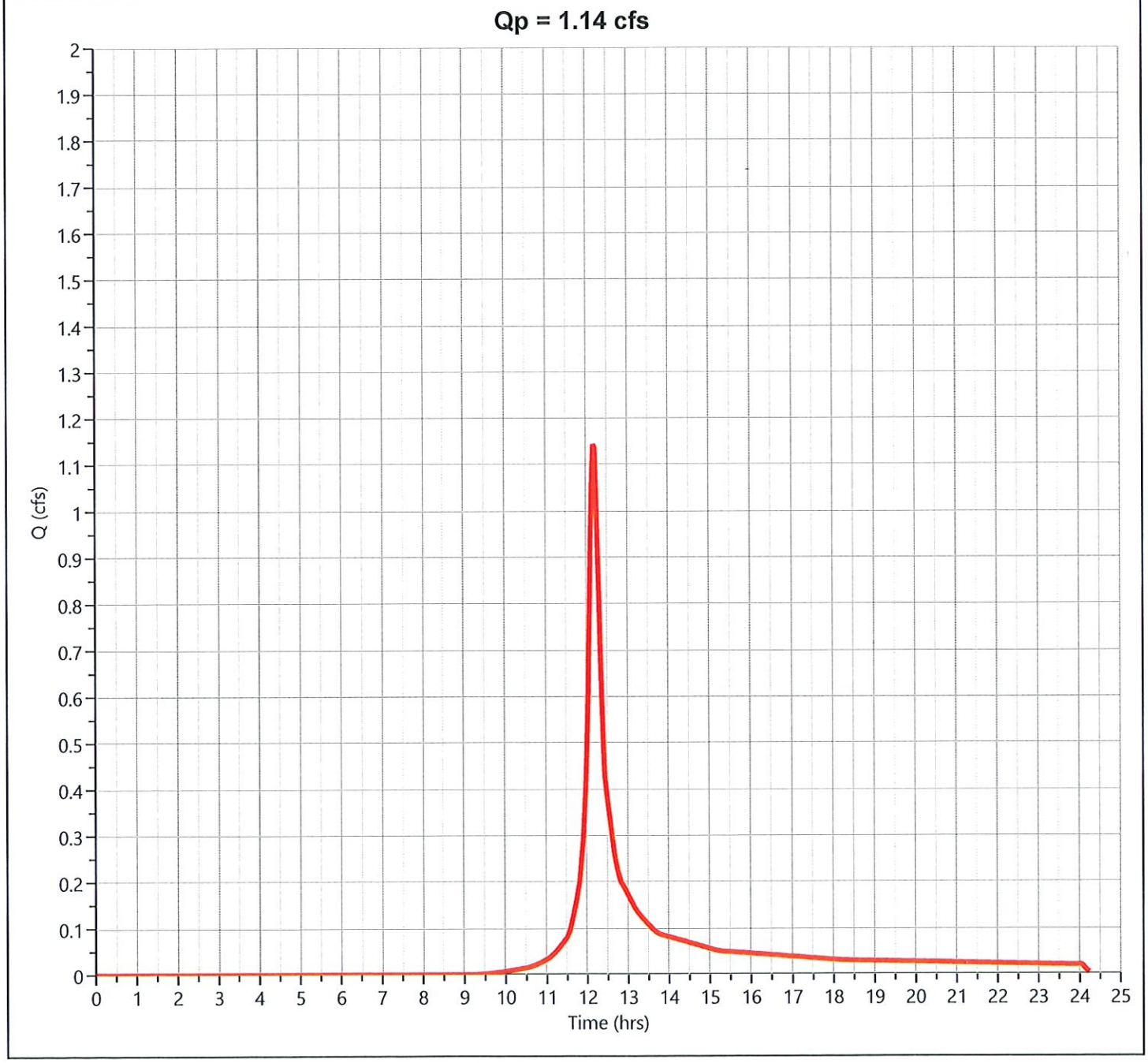
Hydrology Studio v 3.0.0.27

10-16-2023

Post Basin C Pervious

Hyd. No. 18

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.144 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 4,011 cuft
Drainage Area	= 0.5 ac	Curve Number	= 74
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 11.96 min
Total Rainfall	= 4.72 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

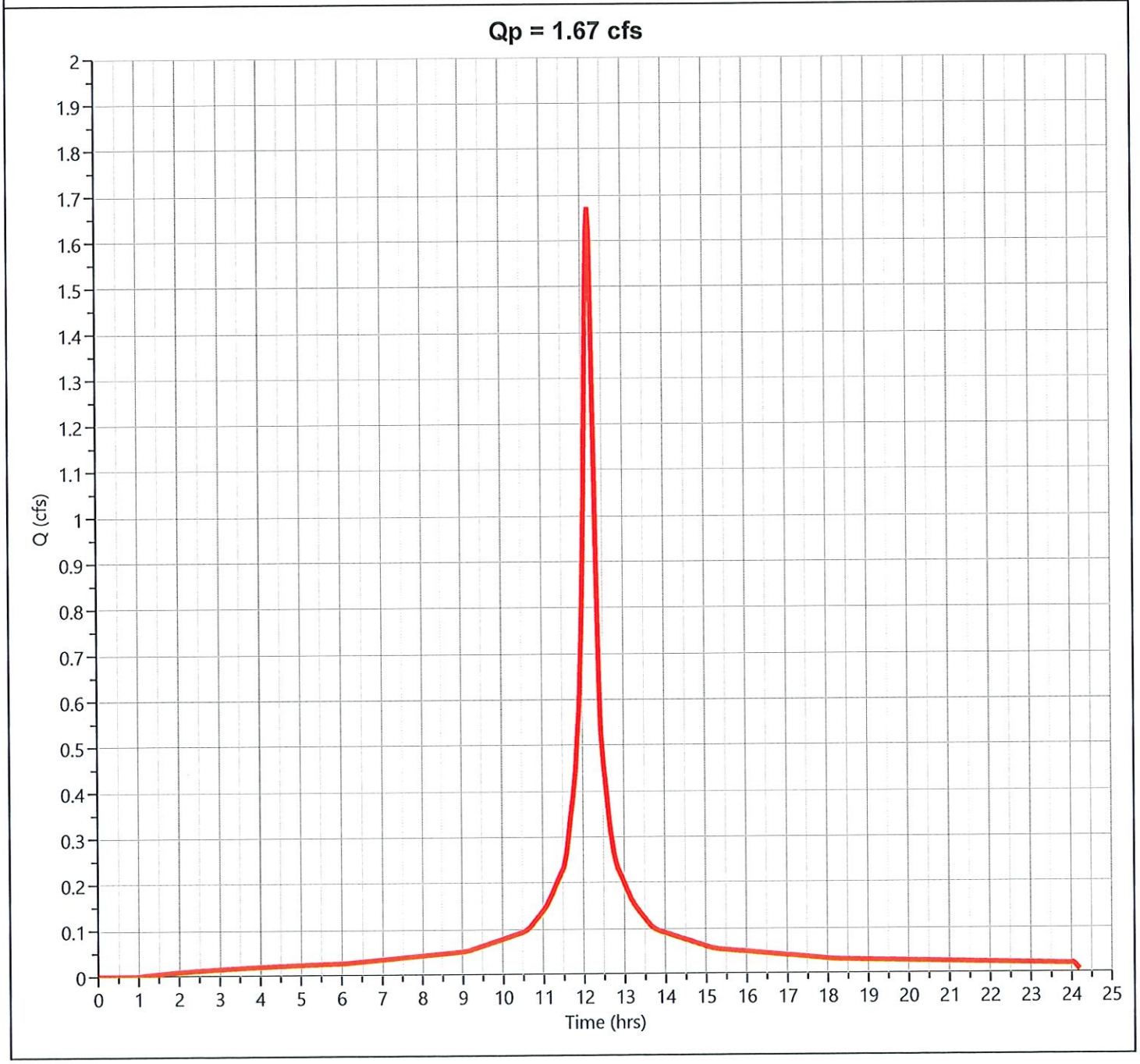
Hydrology Studio v 3.0.0.27

10-16-2023

Post Basin C Impervious

Hyd. No. 19

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.673 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 6,714 cuft
Drainage Area	= 0.4 ac	Curve Number	= 98
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 11.96 min
Total Rainfall	= 4.72 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

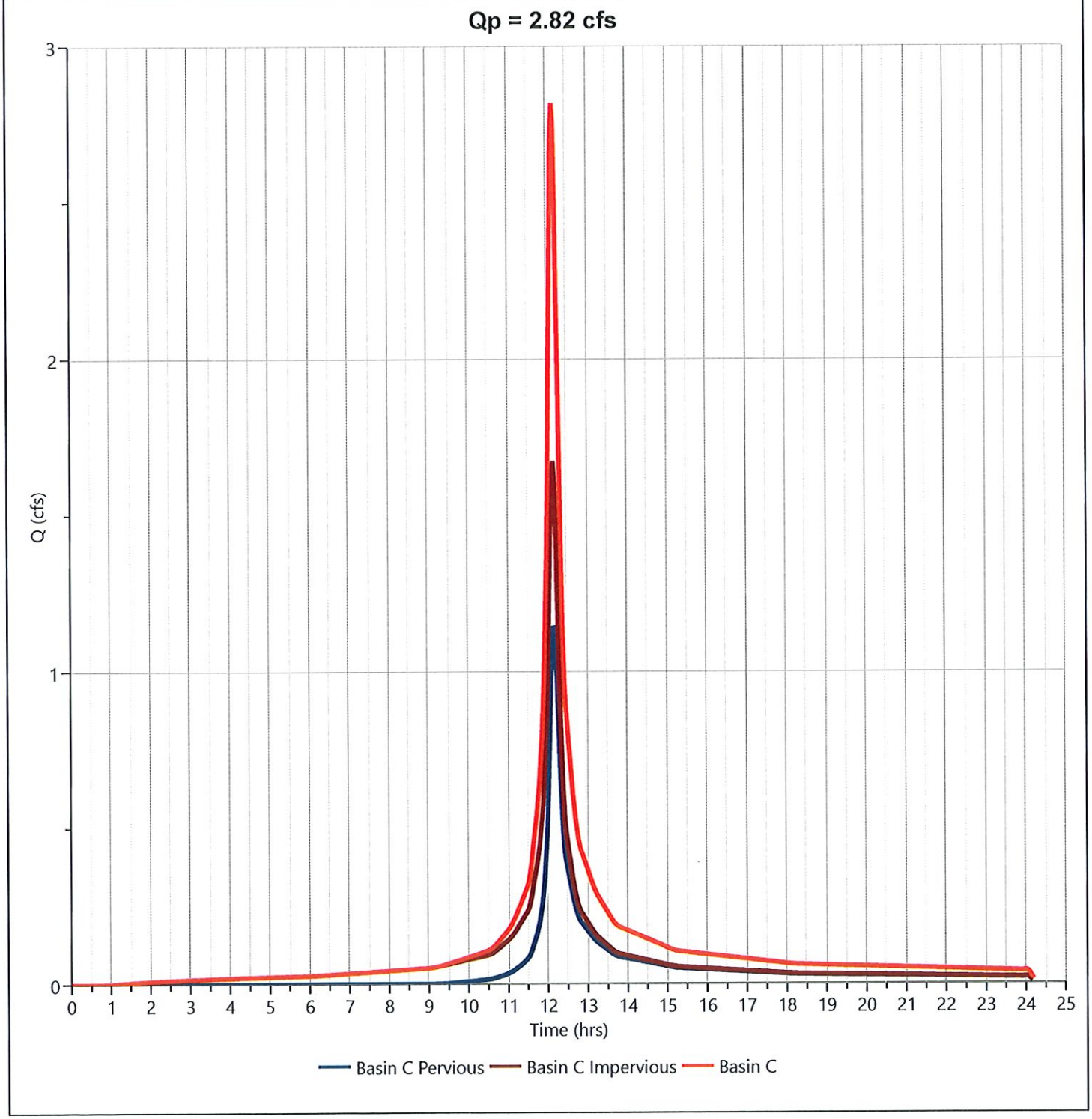
Hydrology Studio v 3.0.0.27

10-16-2023

Post Basin C

Hyd. No. 20

Hydrograph Type	= Junction	Peak Flow	= 2.817 cfs
Storm Frequency	= 10-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 10,725 cuft
Inflow Hydrographs	= 18, 19	Total Contrib. Area	= 0.9 ac



Hydrograph 100-yr Summary

Project Name: AN-153

10-16-2023

Hydrology Studio v 3.0.0.27

Hyd. No.	Hydrograph Type	Hydrograph Name	Peak Flow (cfs)	Time to Peak (hrs)	Hydrograph Volume (cuft)	Inflow Hyd(s)	Maximum Elevation (ft)	Maximum Storage (cuft)
1	NRCS Runoff	Pre Basin A Pervious	1.808	12.17	6,306	----		
2	NRCS Runoff	Pre Basin A Impervious	14.82	12.17	60,277	----		
3	Junction	Pre Basin A	16.63	12.17	66,583	1, 2		
4	NRCS Runoff	Pre Basin B	4.542	12.10	14,346	----		
5	NRCS Runoff	Pre Basin C Pervious	1.117	12.17	3,905	----		
6	NRCS Runoff	Pre Basin C Impervious	5.279	12.17	21,472	----		
7	Junction	Pre Basin C	6.396	12.17	25,378	5, 6		
8	NRCS Runoff	Post Basin A Pervious	2.005	12.17	6,993	----		
9	NRCS Runoff	Post Basin A Impervious	3.752	12.17	15,263	----		
10	NRCS Runoff	Post A Pervious (Pond)	2.413	12.17	8,436	----		
11	NRCS Runoff	Post A Impervious (Pond)	8.649	12.17	35,183	----		
12	Junction	Post Basin A (Pond)	11.06	12.17	43,619	10, 11		
13	Pond Route	Pond A1	10.00	12.20	17,530	12	608.52	10,122
14	Junction	Post Basin A	15.61	12.20	39,786	8, 9, 13		
15	NRCS Runoff	Post Basin B Pervious	0.426	12.10	1,136	----		
16	NRCS Runoff	Post Basin B Impervious	3.425	12.10	10,818	----		
17	Junction	Post Basin B	3.851	12.10	11,955	15, 16		
18	NRCS Runoff	Post Basin C Pervious	2.235	12.17	7,811	----		
19	NRCS Runoff	Post Basin C Impervious	2.544	12.17	10,348	----		
20	Junction	Post Basin C	4.779	12.17	18,159	18, 19		

Hydrograph Report

Project Name: AN-153

Hydrology Studio v 3.0.0.27

10-16-2023

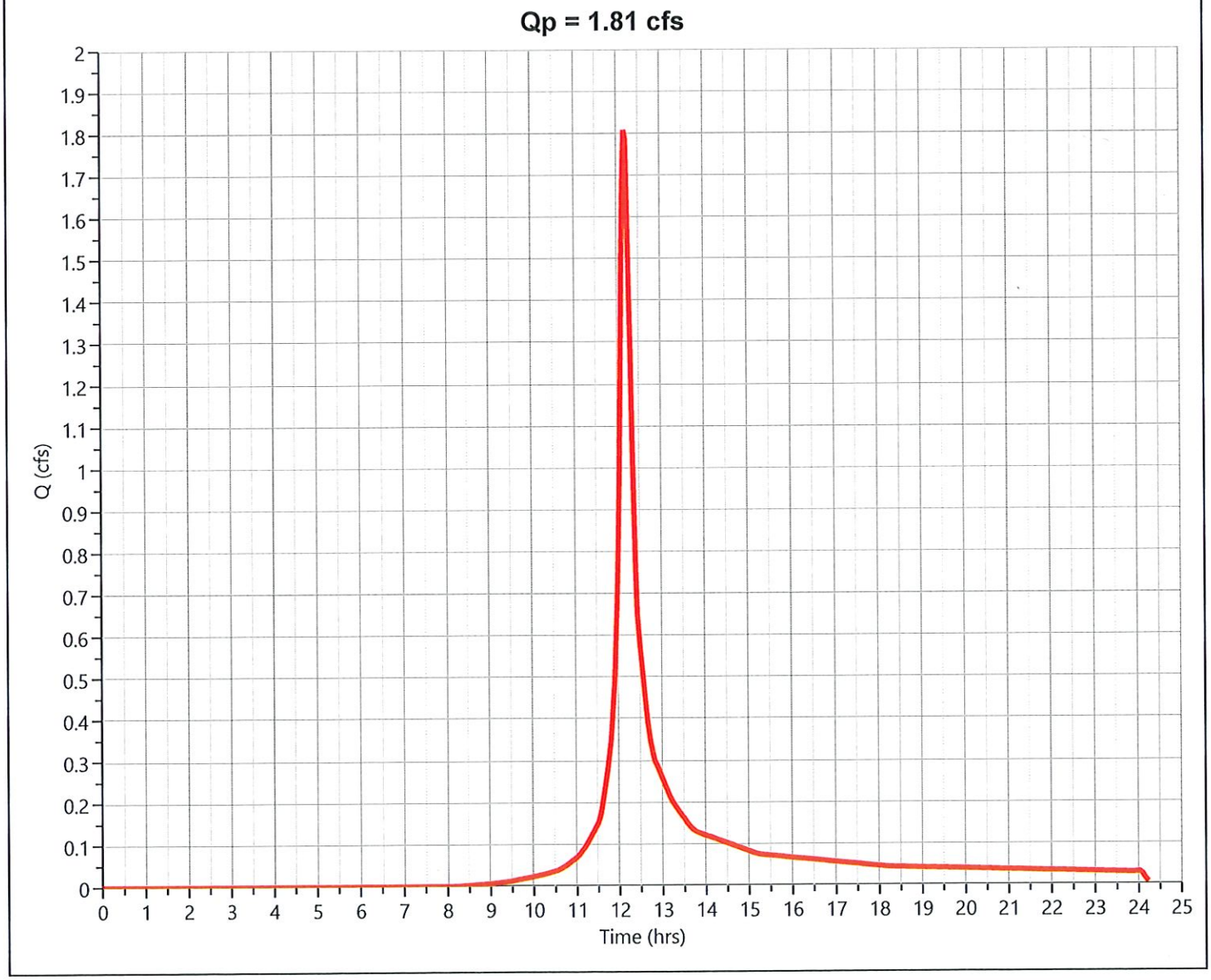
Pre Basin A Pervious

Hyd. No. 1

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.808 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 6,306 cuft
Drainage Area	= 0.45 ac	Curve Number	= 70*
Tc Method	= User	Time of Conc. (Tc)	= 12.04 min
Total Rainfall	= 7.15 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.41	70	Woods, Good Condition
0.04	74	Open Space, Good Condition
0.45	**70**	Weighted CN Method Employed



Hydrograph Report

Project Name: AN-153

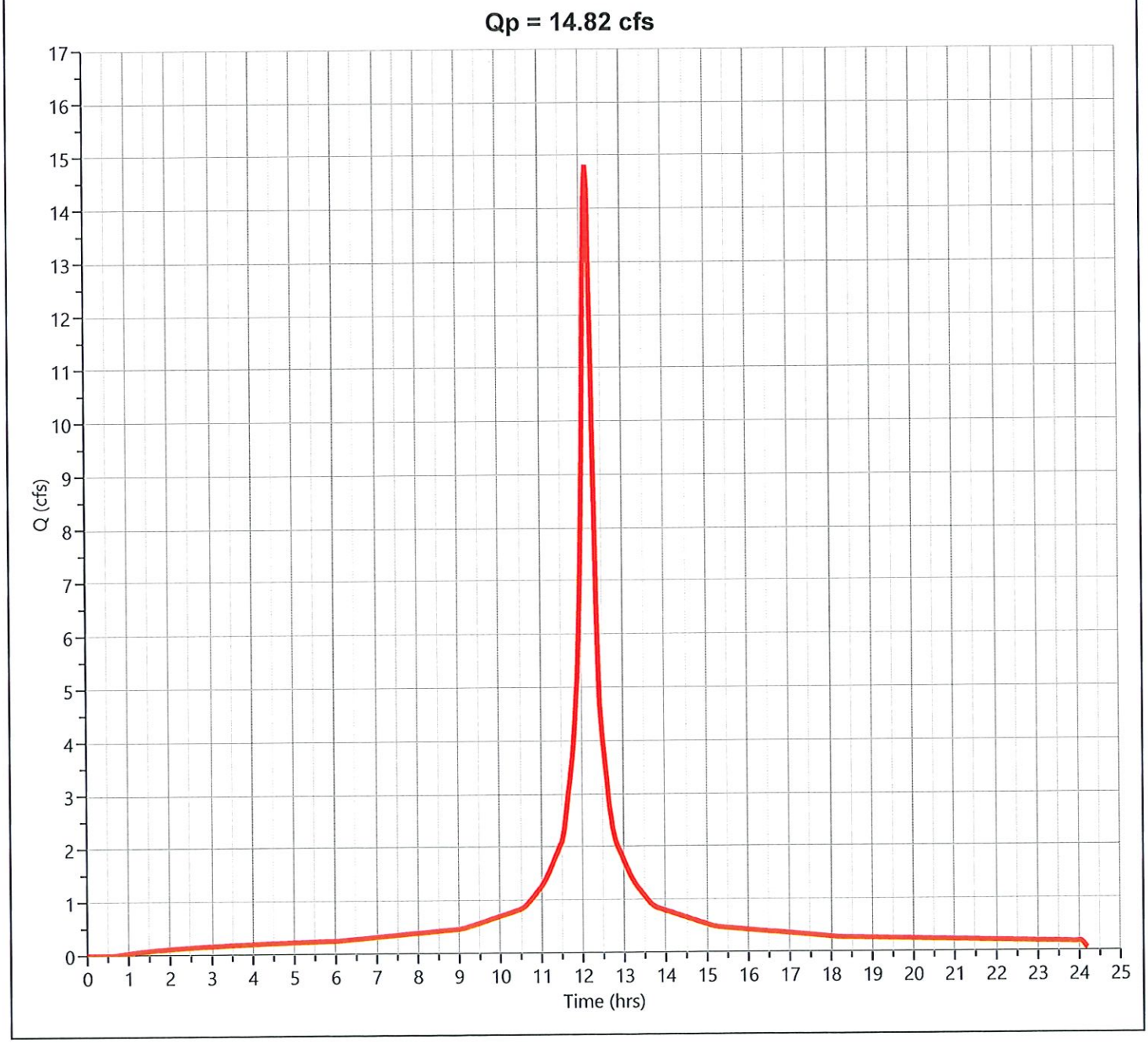
Hydrology Studio v 3.0.0.27

10-16-2023

Pre Basin A Impervious

Hyd. No. 2

Hydrograph Type	= NRCS Runoff	Peak Flow	= 14.82 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 60,277 cuft
Drainage Area	= 2.33 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 12.04 min
Total Rainfall	= 7.15 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

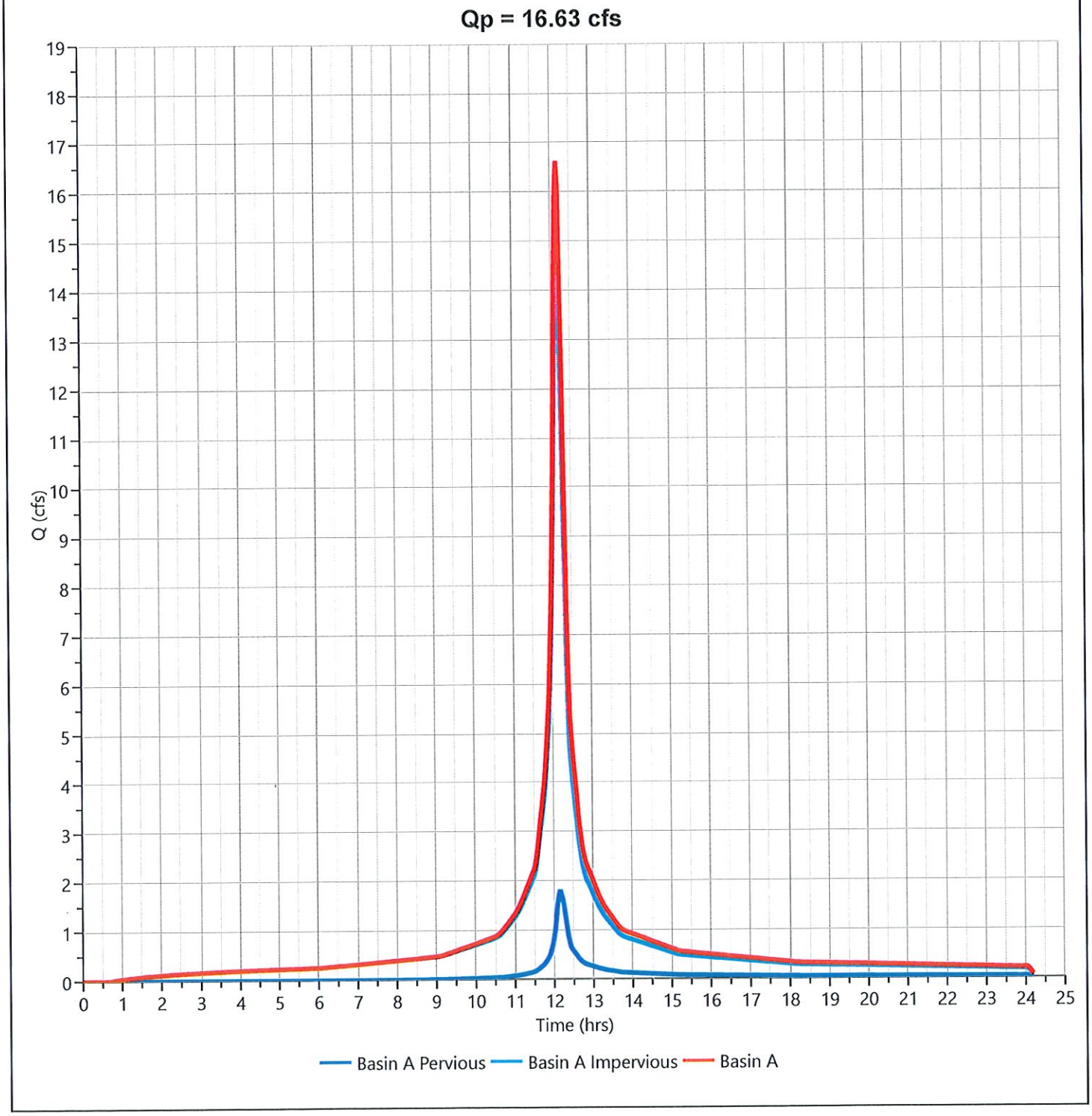
Hydrology Studio v 3.0.0.27

10-16-2023

Pre Basin A

Hyd. No. 3

Hydrograph Type	= Junction	Peak Flow	= 16.63 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 66,583 cuft
Inflow Hydrographs	= 1, 2	Total Contrib. Area	= 2.78 ac



Hydrograph Report

Project Name: AN-153

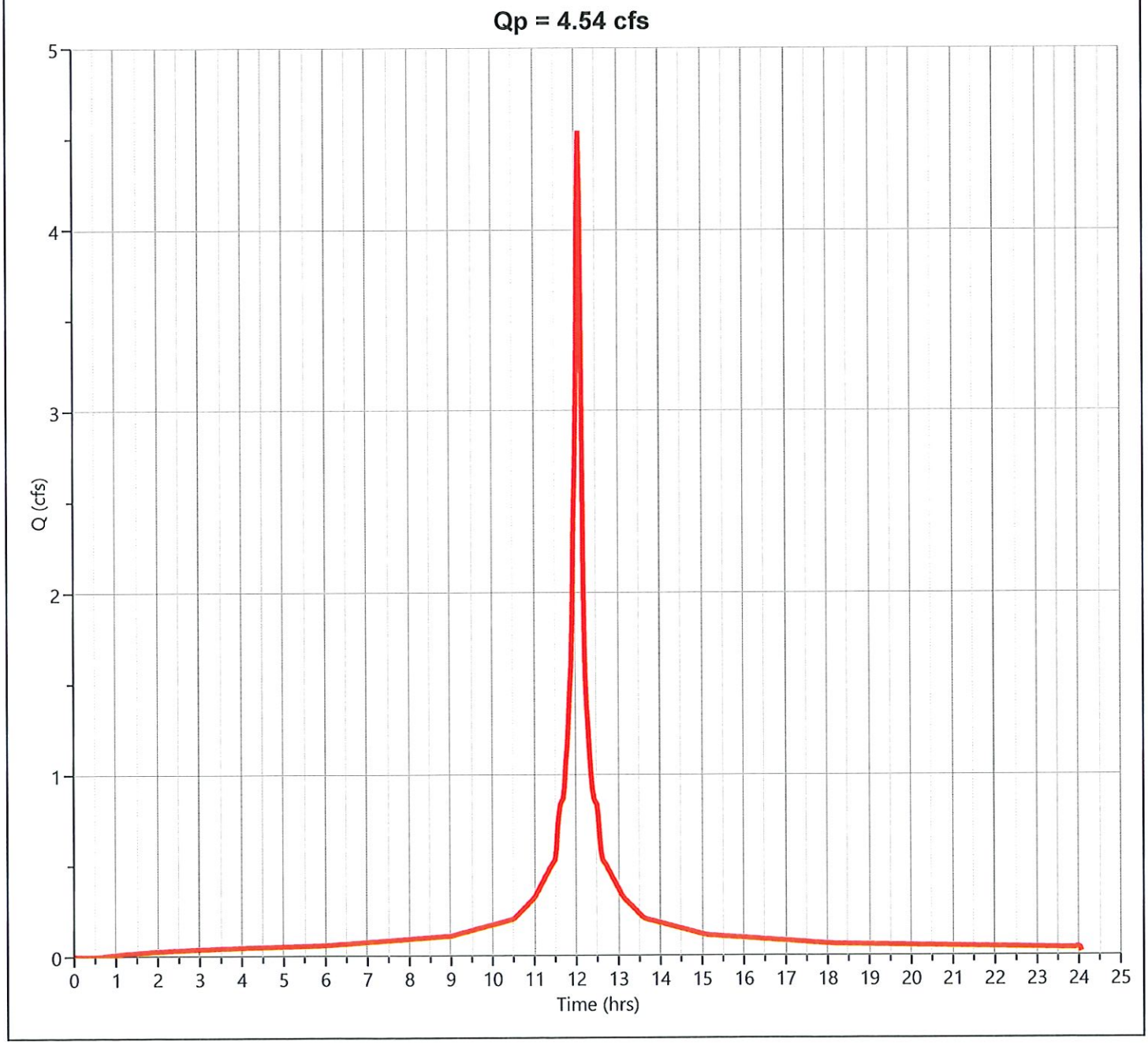
Hydrology Studio v 3.0.0.27

10-16-2023

Pre Basin B

Hyd. No. 4

Hydrograph Type	= NRCS Runoff	Peak Flow	= 4.542 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.10 hrs
Time Interval	= 2 min	Runoff Volume	= 14,346 cuft
Drainage Area	= 0.61 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 6.0 min
Total Rainfall	= 7.15 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

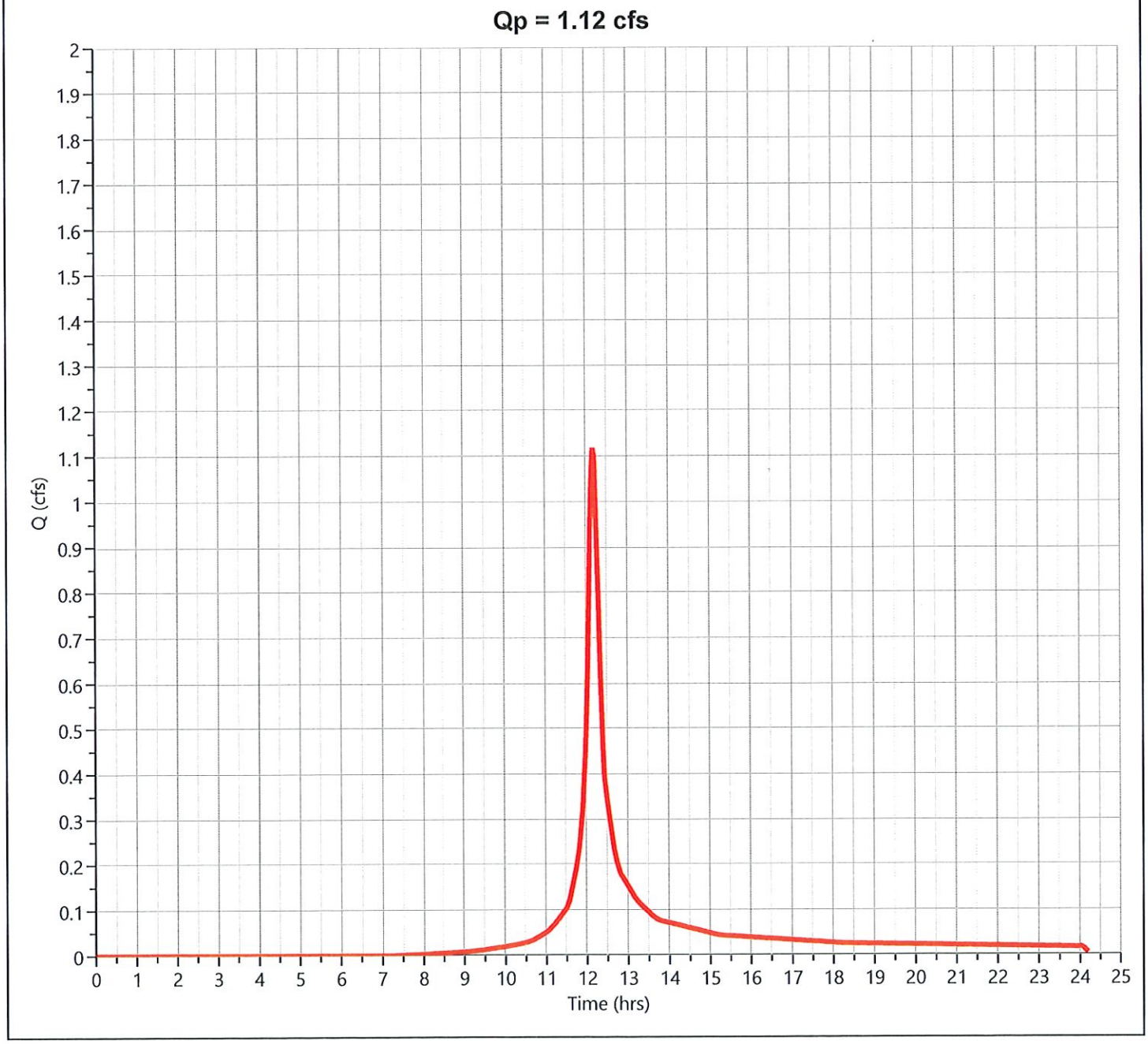
Hydrology Studio v 3.0.0.27

10-16-2023

Pre Basin C Pervious

Hyd. No. 5

Hydrograph Type	= NRCS Runoff	Peak Flow	= 1.117 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 3,905 cuft
Drainage Area	= 0.25 ac	Curve Number	= 74
Tc Method	= User	Time of Conc. (Tc)	= 10.24 min
Total Rainfall	= 7.15 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

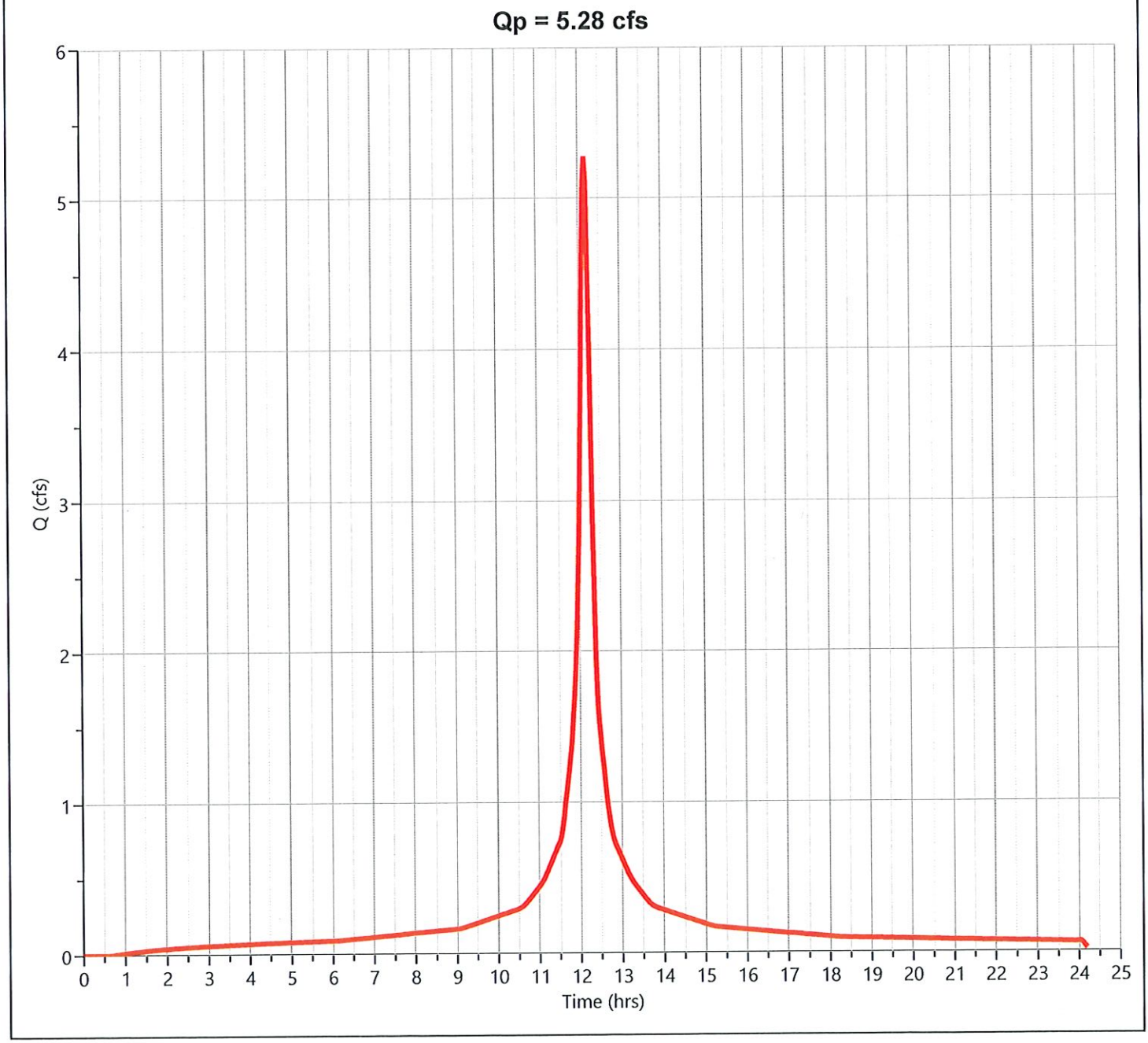
Hydrology Studio v 3.0.0.27

10-16-2023

Pre Basin C Impervious

Hyd. No. 6

Hydrograph Type	= NRCS Runoff	Peak Flow	= 5.279 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 21,472 cuft
Drainage Area	= 0.83 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 10.24 min
Total Rainfall	= 7.15 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

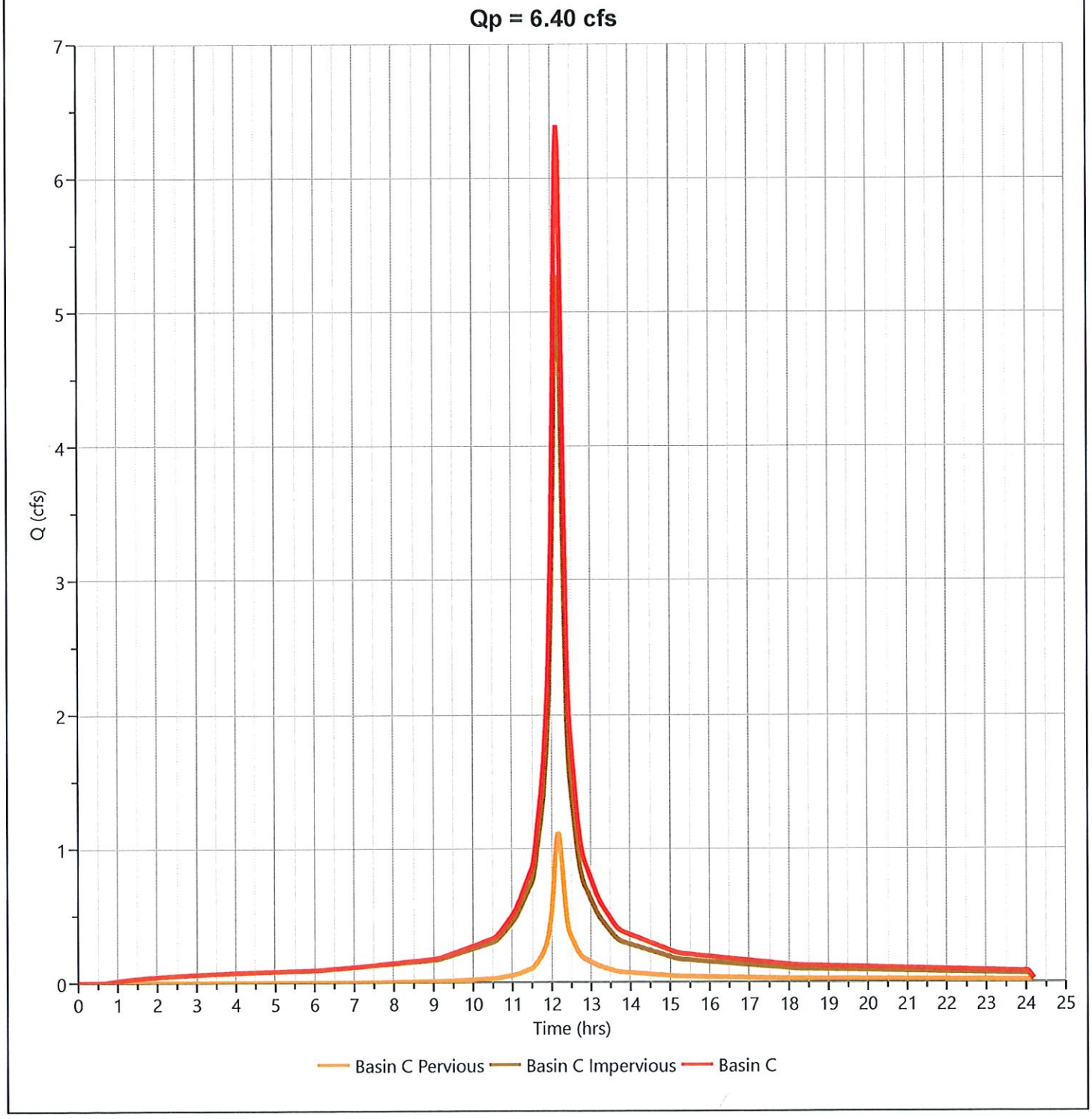
Hydrology Studio v 3.0.0.27

10-16-2023

Pre Basin C

Hyd. No. 7

Hydrograph Type	= Junction	Peak Flow	= 6.396 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 25,378 cuft
Inflow Hydrographs	= 5, 6	Total Contrib. Area	= 1.08 ac



Hydrograph Report

Project Name: AN-153

Hydrology Studio v 3.0.0.27

10-16-2023

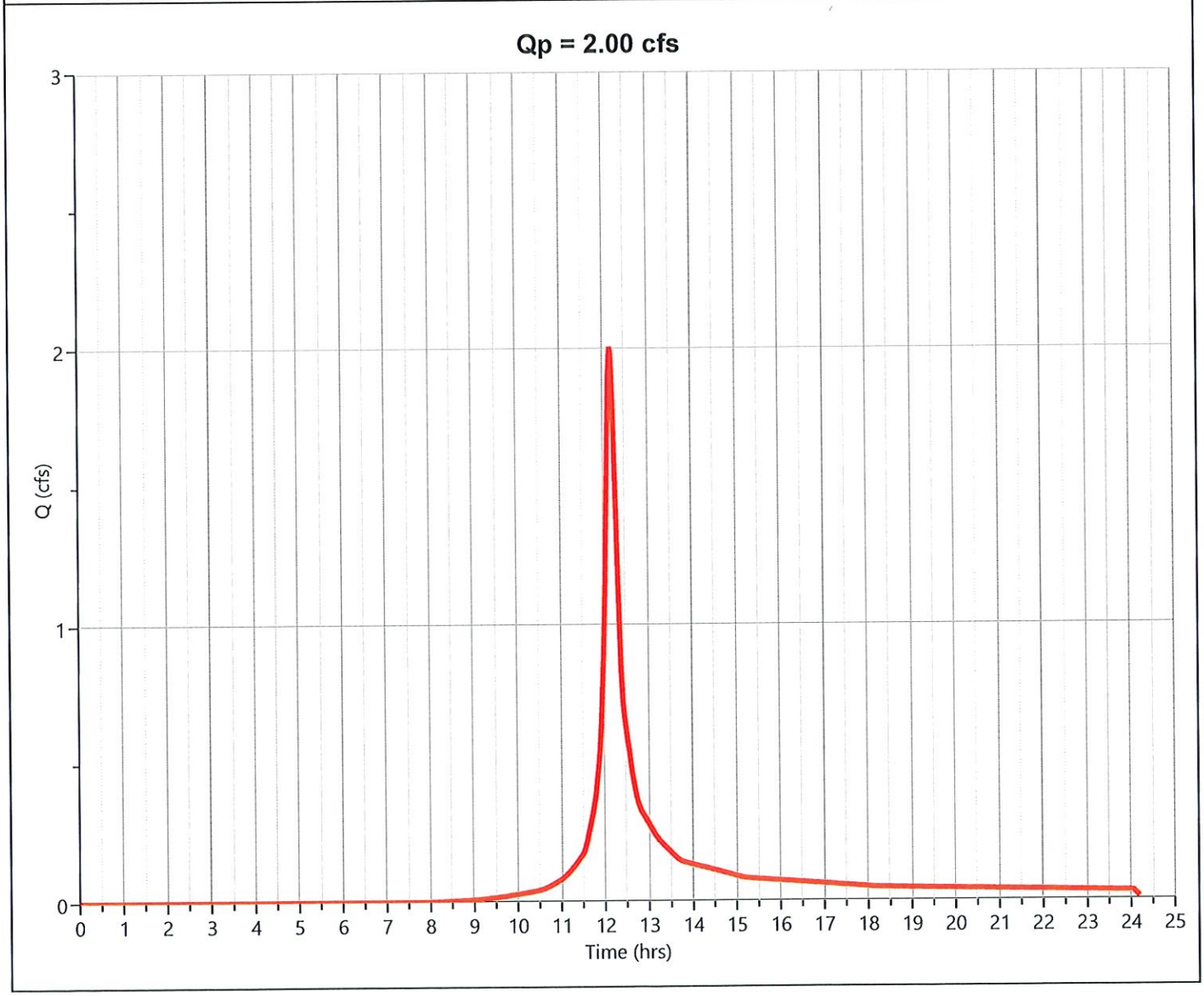
Post Basin A Pervious

Hyd. No. 8

Hydrograph Type	= NRCS Runoff	Peak Flow	= 2.005 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 6,993 cuft
Drainage Area	= 0.49 ac	Curve Number	= 70.65*
Tc Method	= User	Time of Conc. (Tc)	= 12.3 min
Total Rainfall	= 7.15 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484

*** Composite CN Worksheet**

AREA (ac)	CN	DESCRIPTION
0.41	70	Woods, Good
0.08	74	Open Space, Good
0.49	**71**	Weighted CN Method Employed



Hydrograph Report

Project Name: AN-153

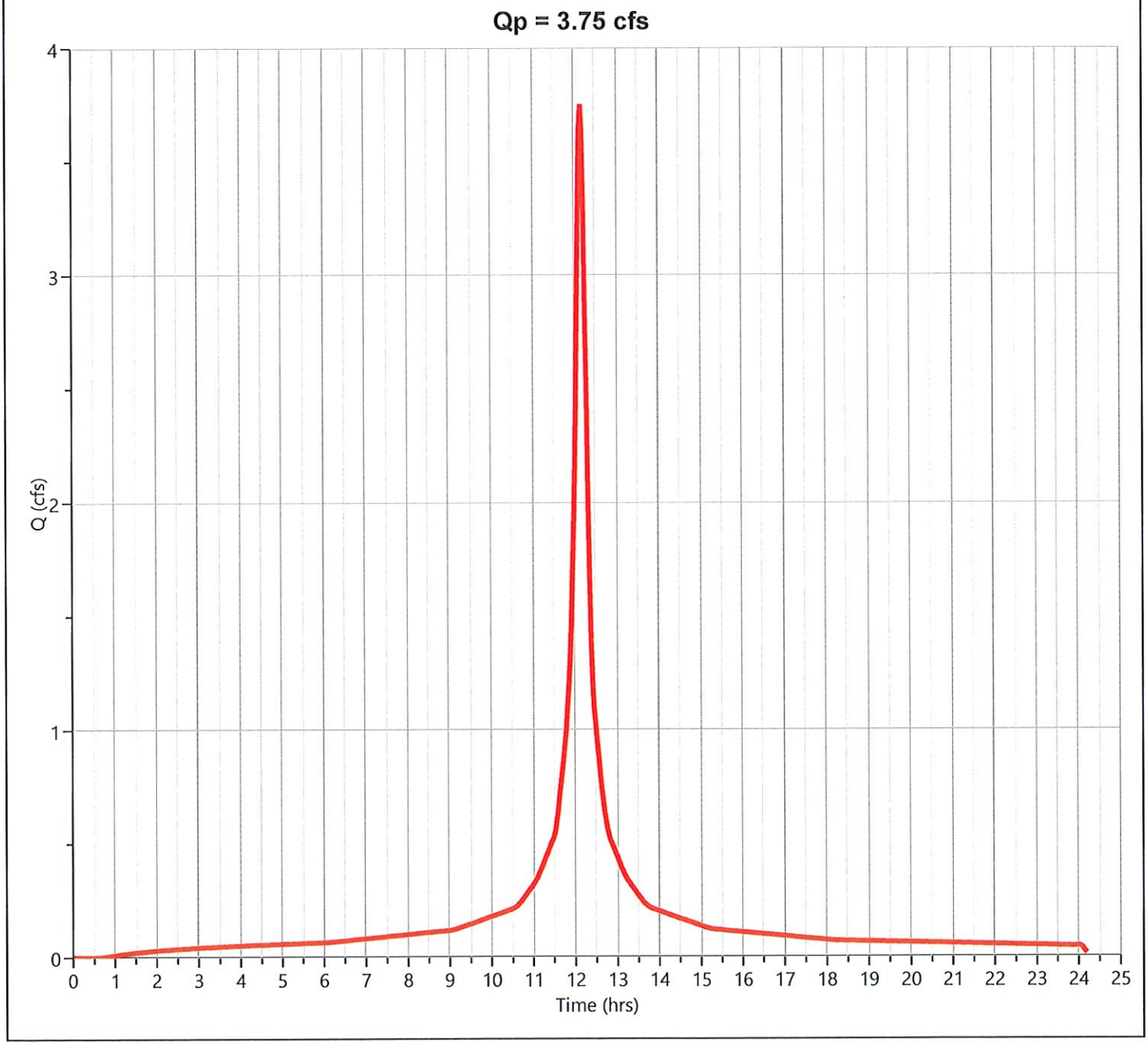
Hydrology Studio v 3.0.0.27

10-16-2023

Post Basin A Impervious

Hyd. No. 9

Hydrograph Type	= NRCS Runoff	Peak Flow	= 3.752 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 15,263 cuft
Drainage Area	= 0.59 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 12.3 min
Total Rainfall	= 7.15 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

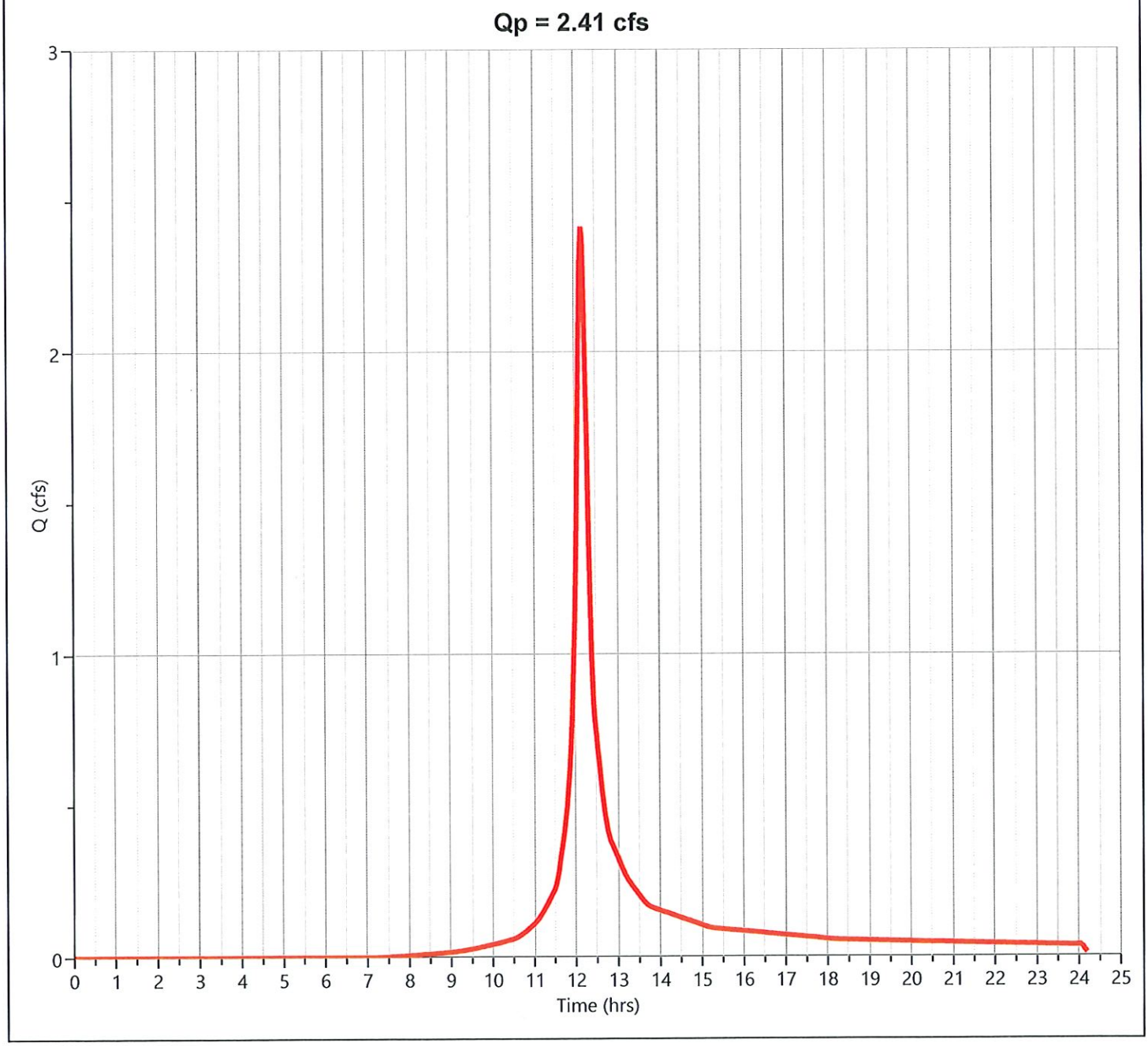
Hydrology Studio v 3.0.0.27

10-16-2023

Post A Pervious (Pond)

Hyd. No. 10

Hydrograph Type	= NRCS Runoff	Peak Flow	= 2.413 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 8,436 cuft
Drainage Area	= 0.54 ac	Curve Number	= 74
Tc Method	= User	Time of Conc. (Tc)	= 12.3 min
Total Rainfall	= 7.15 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

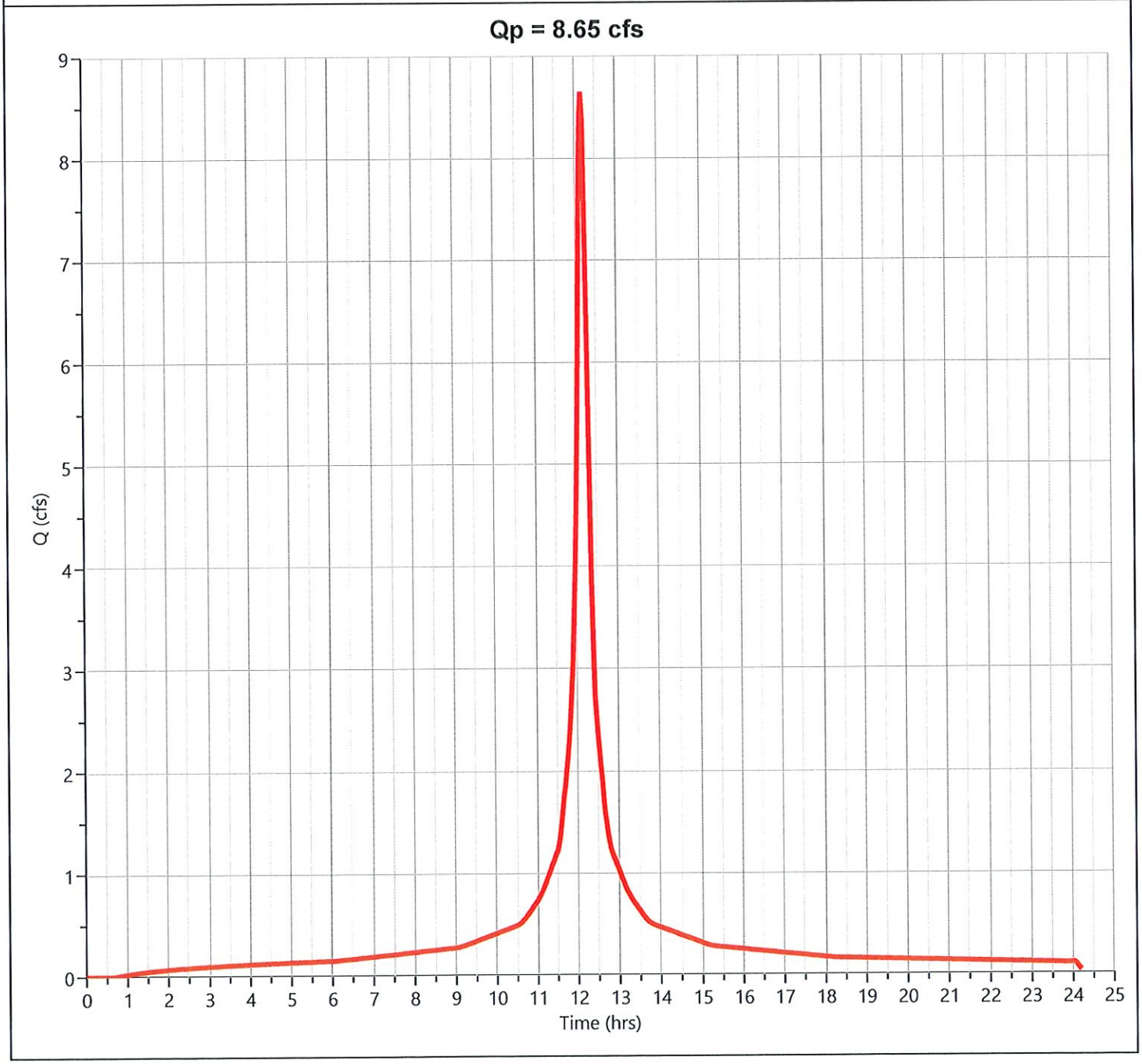
Hydrology Studio v 3.0.0.27

10-16-2023

Post A Impervious (Pond)

Hyd. No. 11

Hydrograph Type	= NRCS Runoff	Peak Flow	= 8.649 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 35,183 cuft
Drainage Area	= 1.36 ac	Curve Number	= 98
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 12.3 min
Total Rainfall	= 7.15 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

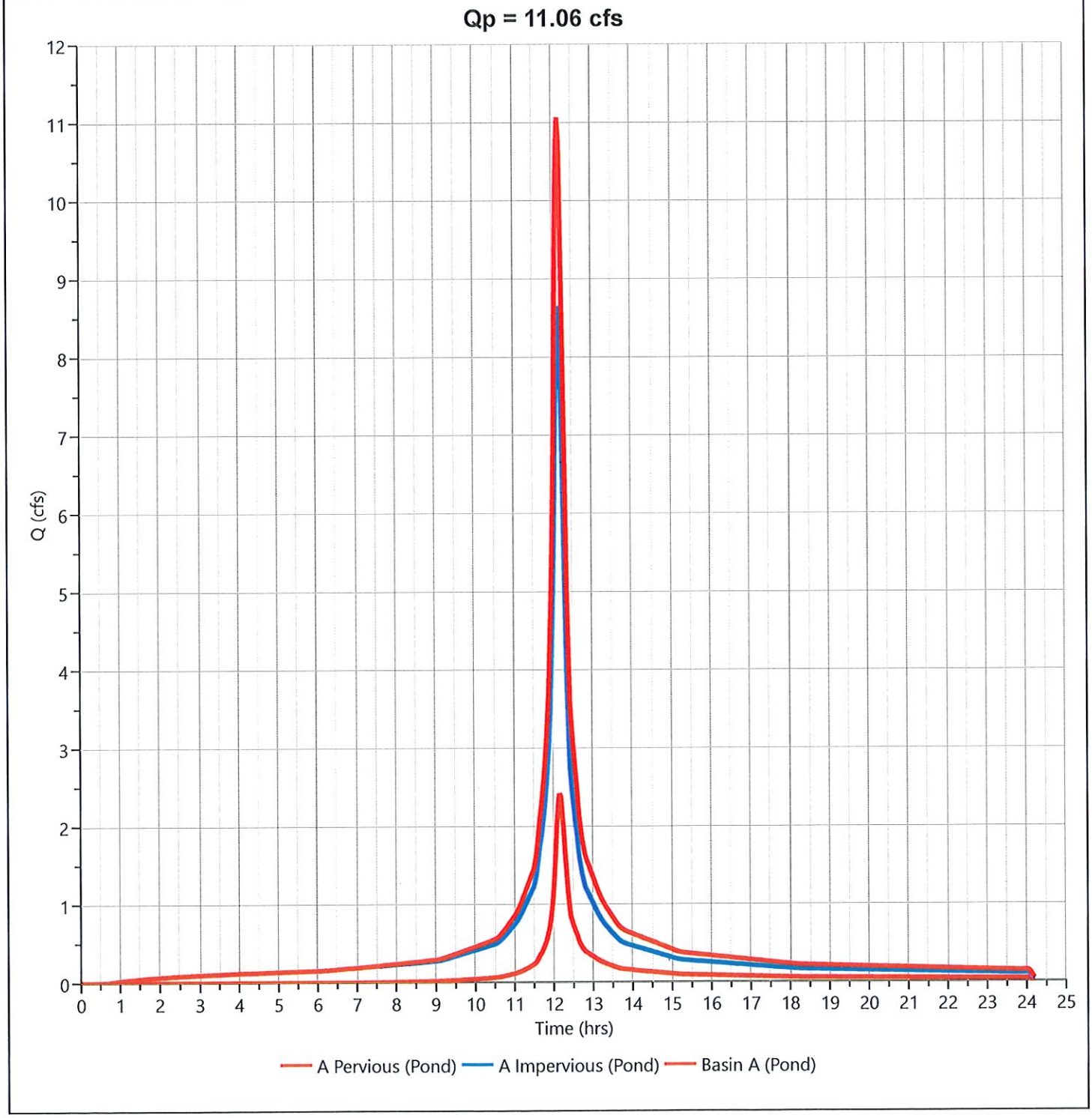
Hydrology Studio v 3.0.0.27

10-16-2023

Post Basin A (Pond)

Hyd. No. 12

Hydrograph Type	= Junction	Peak Flow	= 11.06 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 43,619 cuft
Inflow Hydrographs	= 10, 11	Total Contrib. Area	= 1.9 ac



Hydrograph Report

Project Name: AN-153

Hydrology Studio v 3.0.0.27

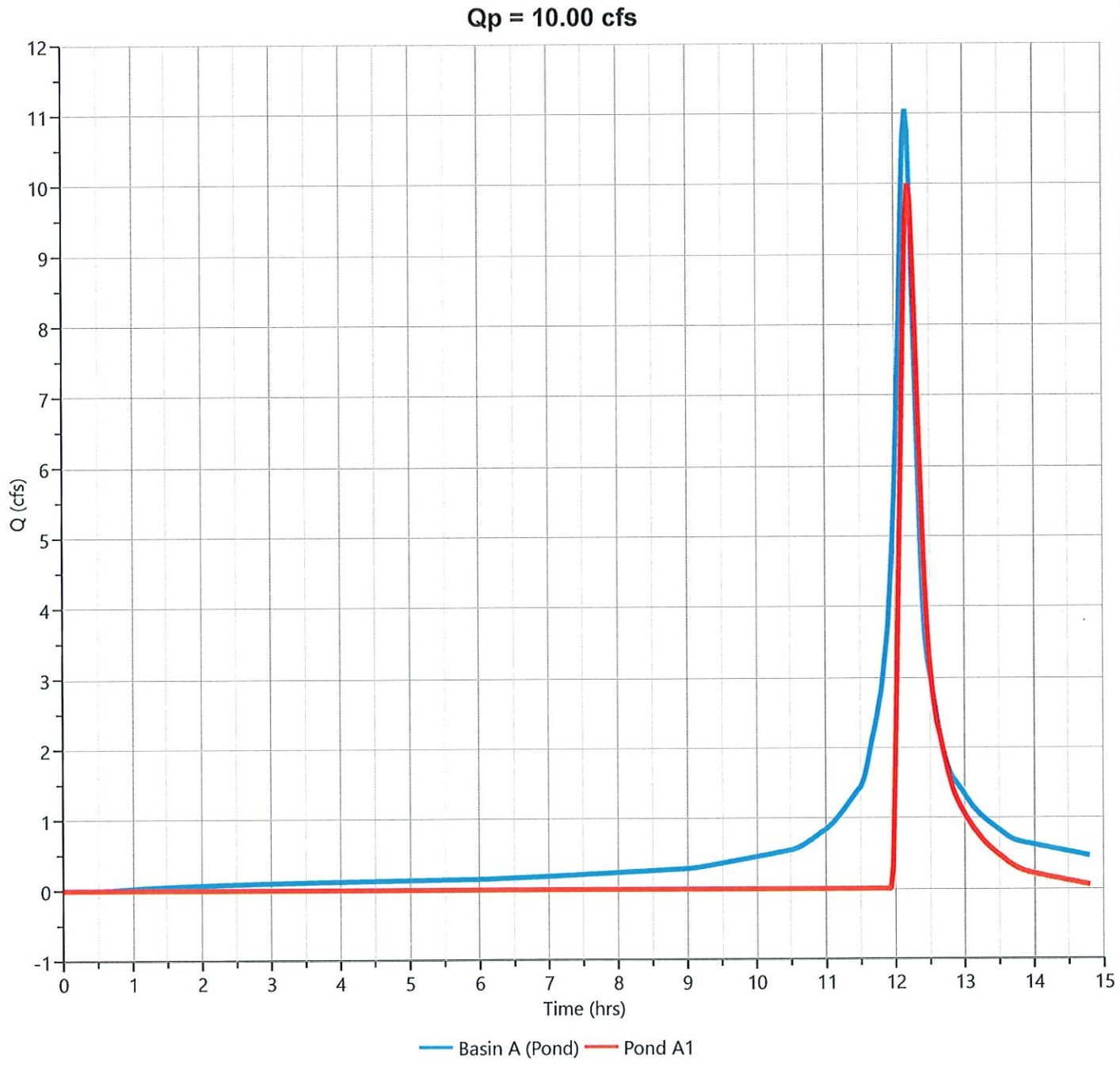
10-16-2023

Pond A1

Hyd. No. 13

Hydrograph Type	= Pond Route	Peak Flow	= 10.00 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Hydrograph Volume	= 17,530 cuft
Inflow Hydrograph	= 12 - Basin A (Pond)	Max. Elevation	= 608.52 ft
Pond Name	= Pond A	Max. Storage	= 10,122 cuft

Pond Routing by Storage Indication Method



Hydrograph Report

Project Name: AN-153

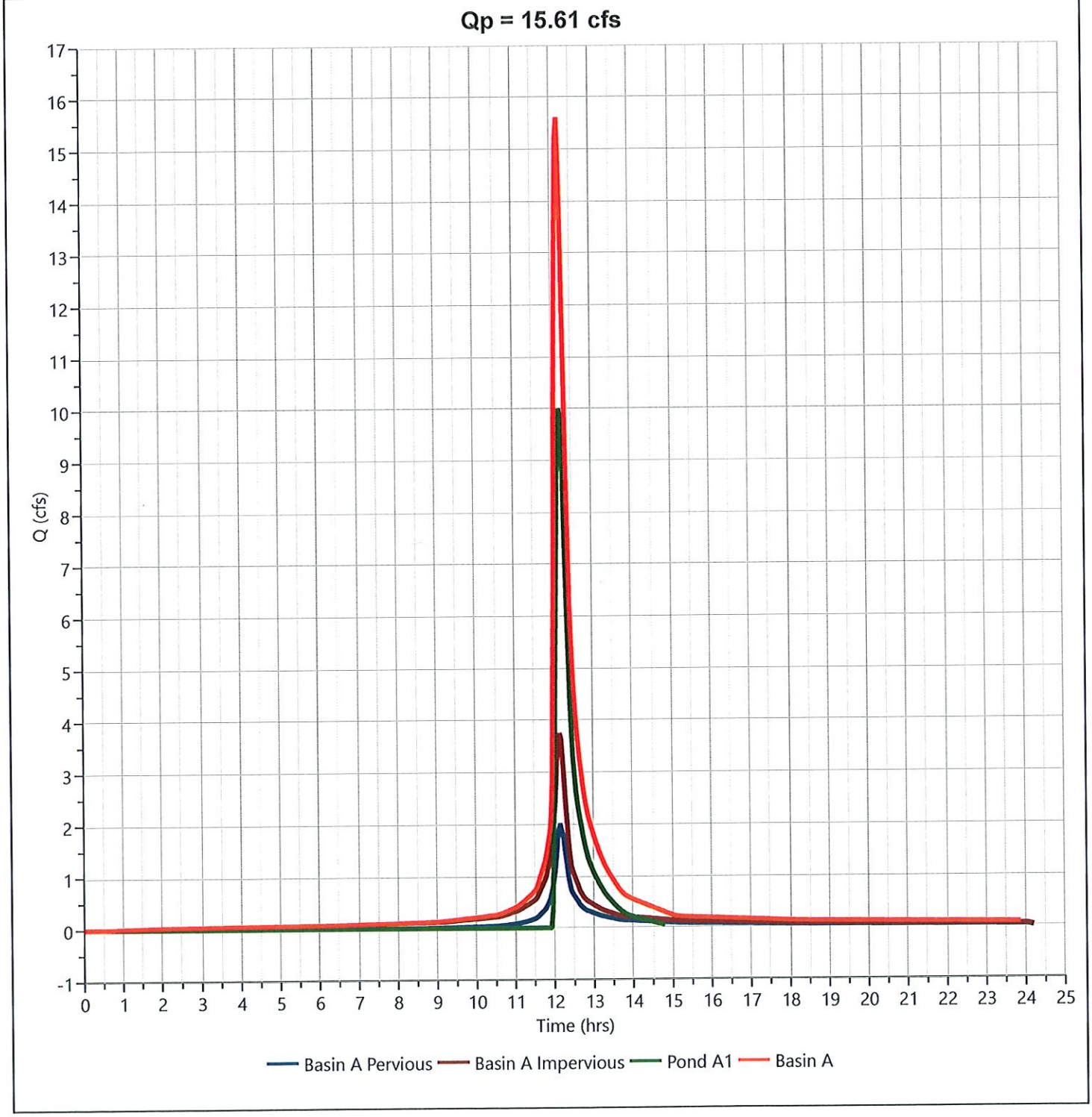
Hydrology Studio v 3.0.0.27

10-16-2023

Post Basin A

Hyd. No. 14

Hydrograph Type	= Junction	Peak Flow	= 15.61 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.20 hrs
Time Interval	= 2 min	Hydrograph Volume	= 39,786 cuft
Inflow Hydrographs	= 8, 9, 13	Total Contrib. Area	= 1.08 ac



Hydrograph Report

Project Name: AN-153

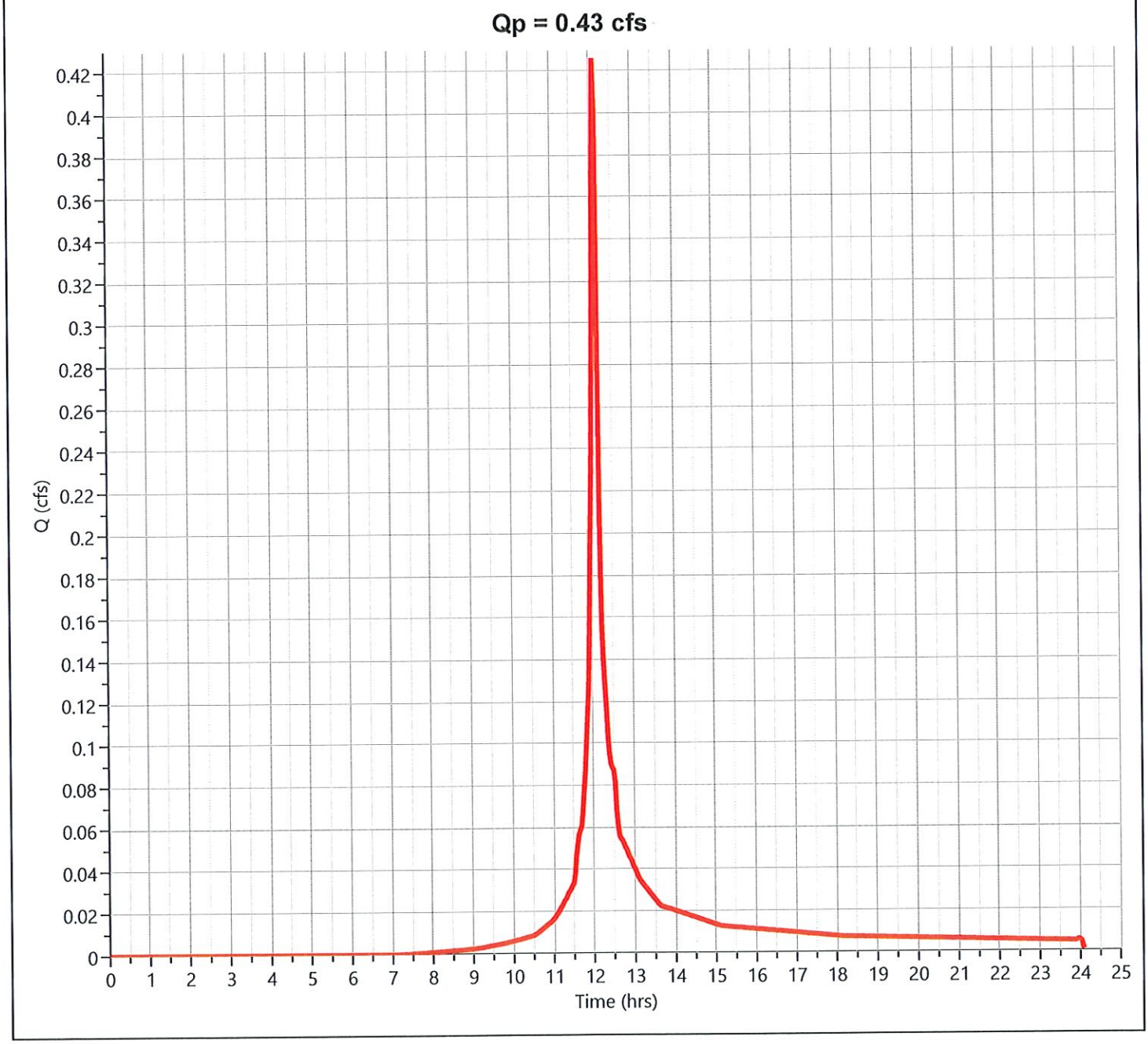
Hydrology Studio v 3.0.0.27

10-16-2023

Post Basin B Pervious

Hyd. No. 15

Hydrograph Type	= NRCS Runoff	Peak Flow	= 0.426 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.10 hrs
Time Interval	= 2 min	Runoff Volume	= 1,136 cuft
Drainage Area	= 0.08 ac	Curve Number	= 74
Tc Method	= User	Time of Conc. (Tc)	= 6.0 min
Total Rainfall	= 7.15 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

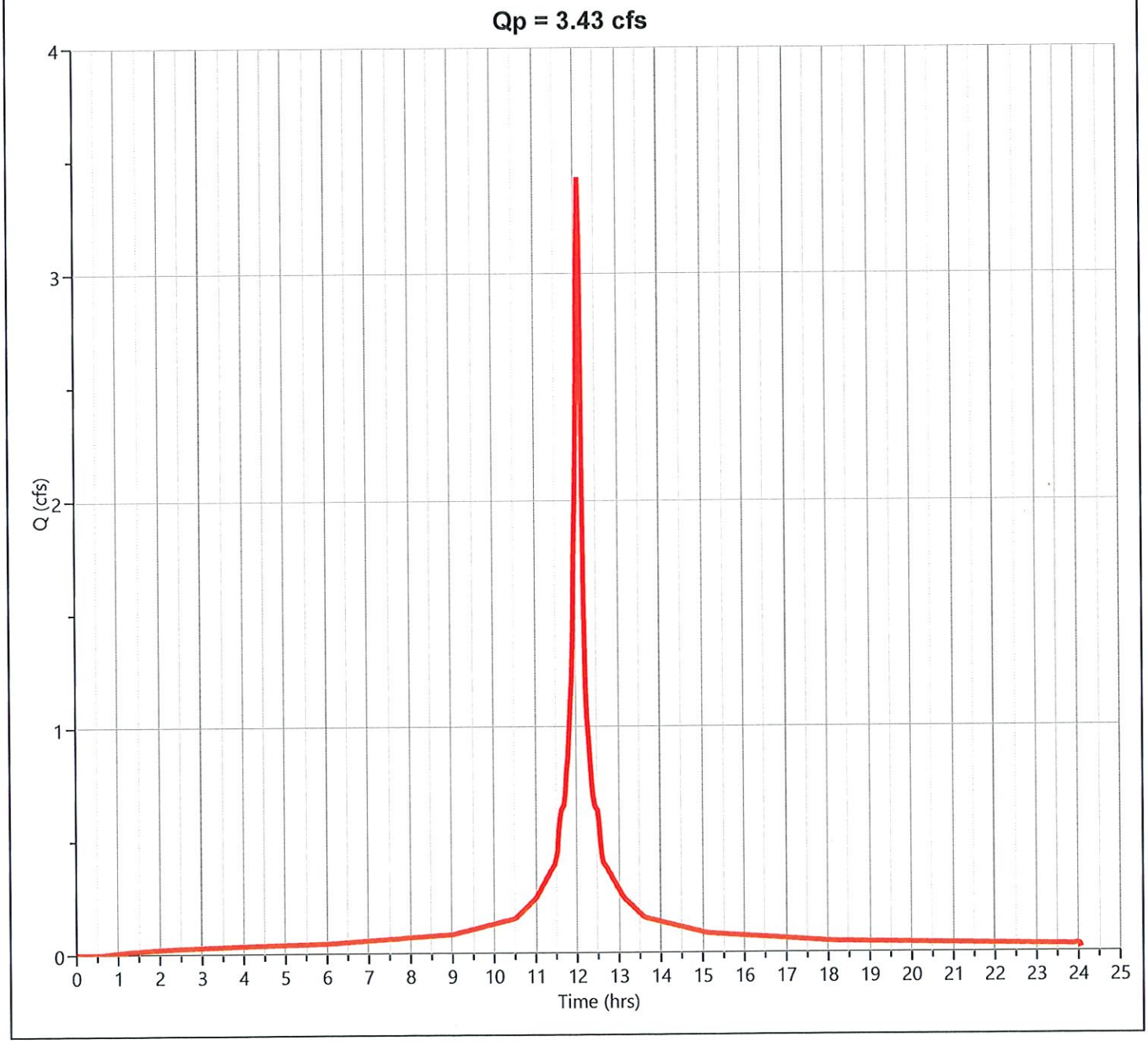
Hydrology Studio v 3.0.0.27

10-16-2023

Post Basin B Impervious

Hyd. No. 16

Hydrograph Type	= NRCS Runoff	Peak Flow	= 3.425 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.10 hrs
Time Interval	= 2 min	Runoff Volume	= 10,818 cuft
Drainage Area	= 0.46 ac	Curve Number	= 98
Tc Method	= User	Time of Conc. (Tc)	= 6.0 min
Total Rainfall	= 7.15 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

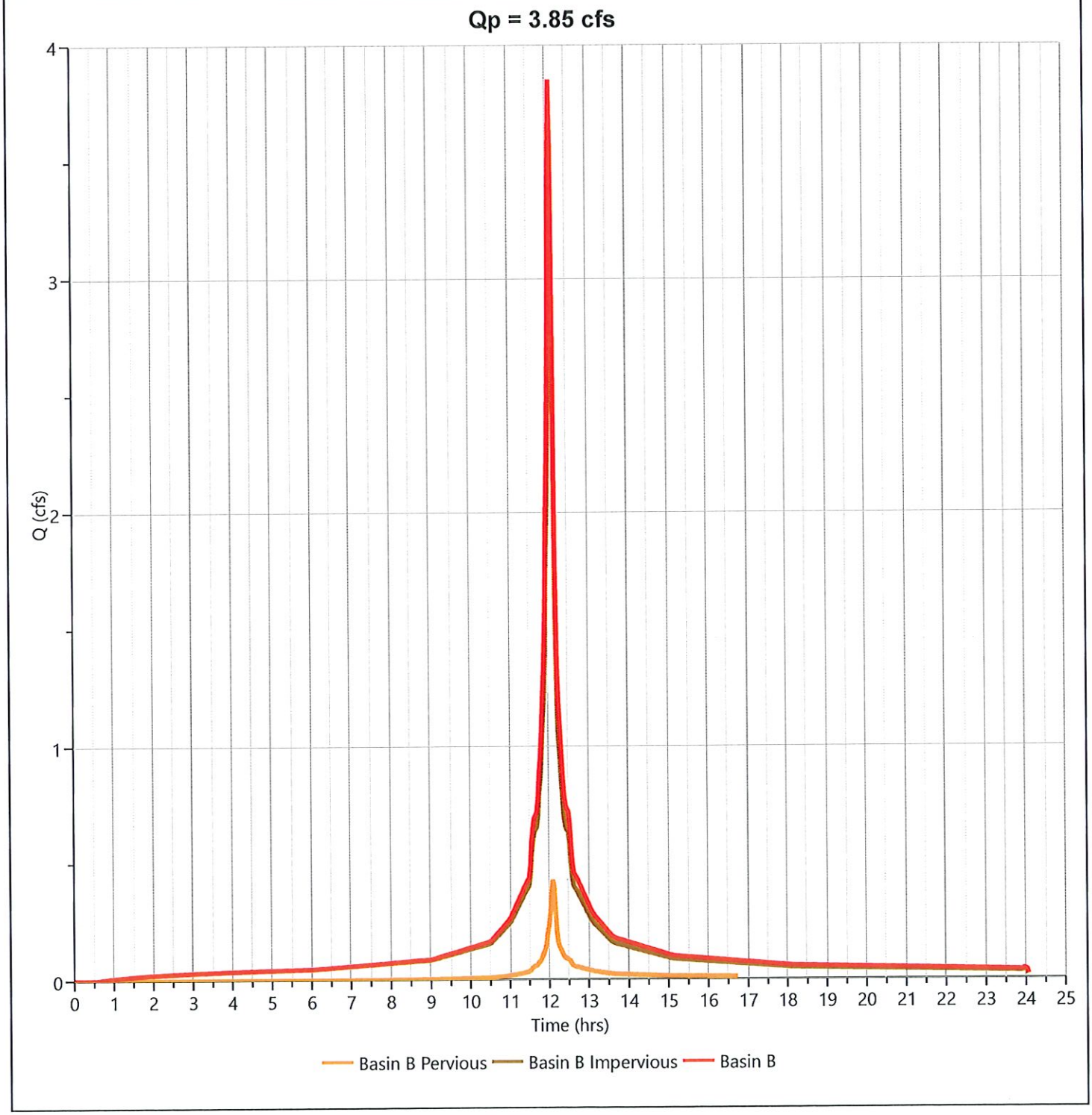
Hydrology Studio v 3.0.0.27

10-16-2023

Post Basin B

Hyd. No. 17

Hydrograph Type	= Junction	Peak Flow	= 3.851 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.10 hrs
Time Interval	= 2 min	Hydrograph Volume	= 11,955 cuft
Inflow Hydrographs	= 15, 16	Total Contrib. Area	= 0.54 ac



Hydrograph Report

Project Name: AN-153

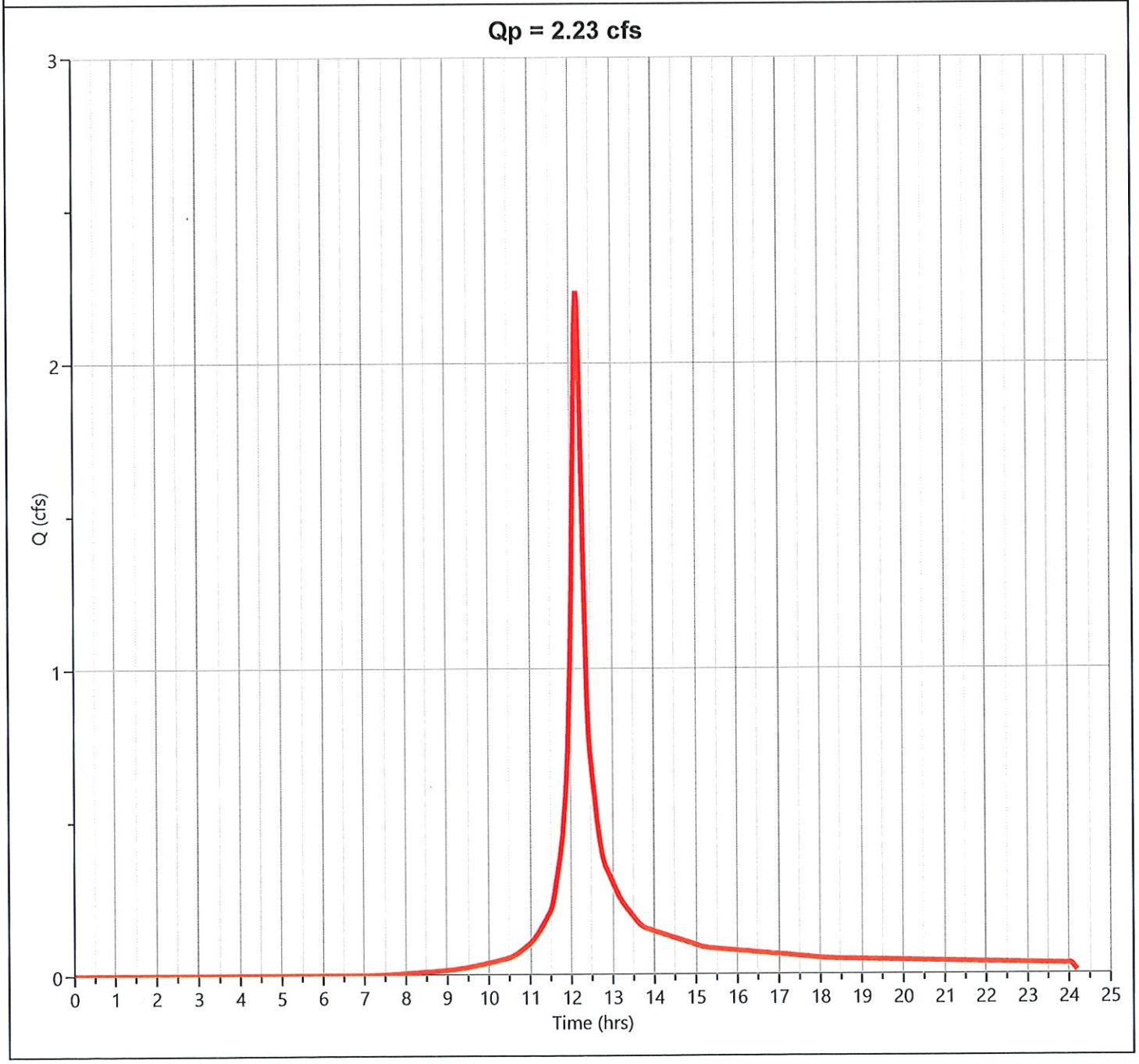
Hydrology Studio v 3.0.0.27

10-16-2023

Post Basin C Pervious

Hyd. No. 18

Hydrograph Type	= NRCS Runoff	Peak Flow	= 2.235 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 7,811 cuft
Drainage Area	= 0.5 ac	Curve Number	= 74
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 11.96 min
Total Rainfall	= 7.15 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

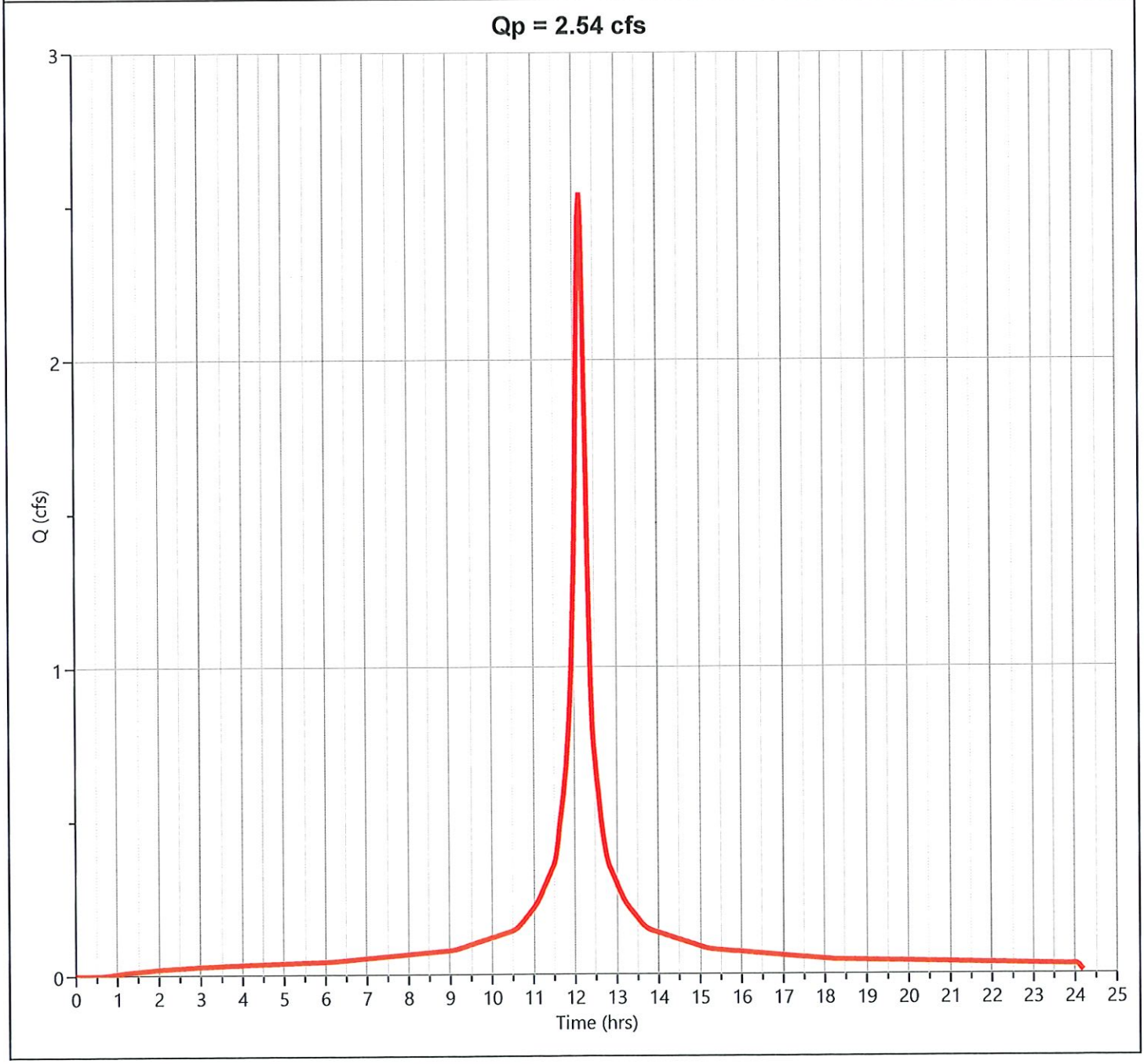
Hydrology Studio v 3.0.0.27

10-16-2023

Post Basin C Impervious

Hyd. No. 19

Hydrograph Type	= NRCS Runoff	Peak Flow	= 2.544 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Runoff Volume	= 10,348 cuft
Drainage Area	= 0.4 ac	Curve Number	= 98
Tc Method	= TR55 (See Worksheet)	Time of Conc. (Tc)	= 11.96 min
Total Rainfall	= 7.15 in	Design Storm	= NOAA-C
Storm Duration	= 24 hrs	Shape Factor	= 484



Hydrograph Report

Project Name: AN-153

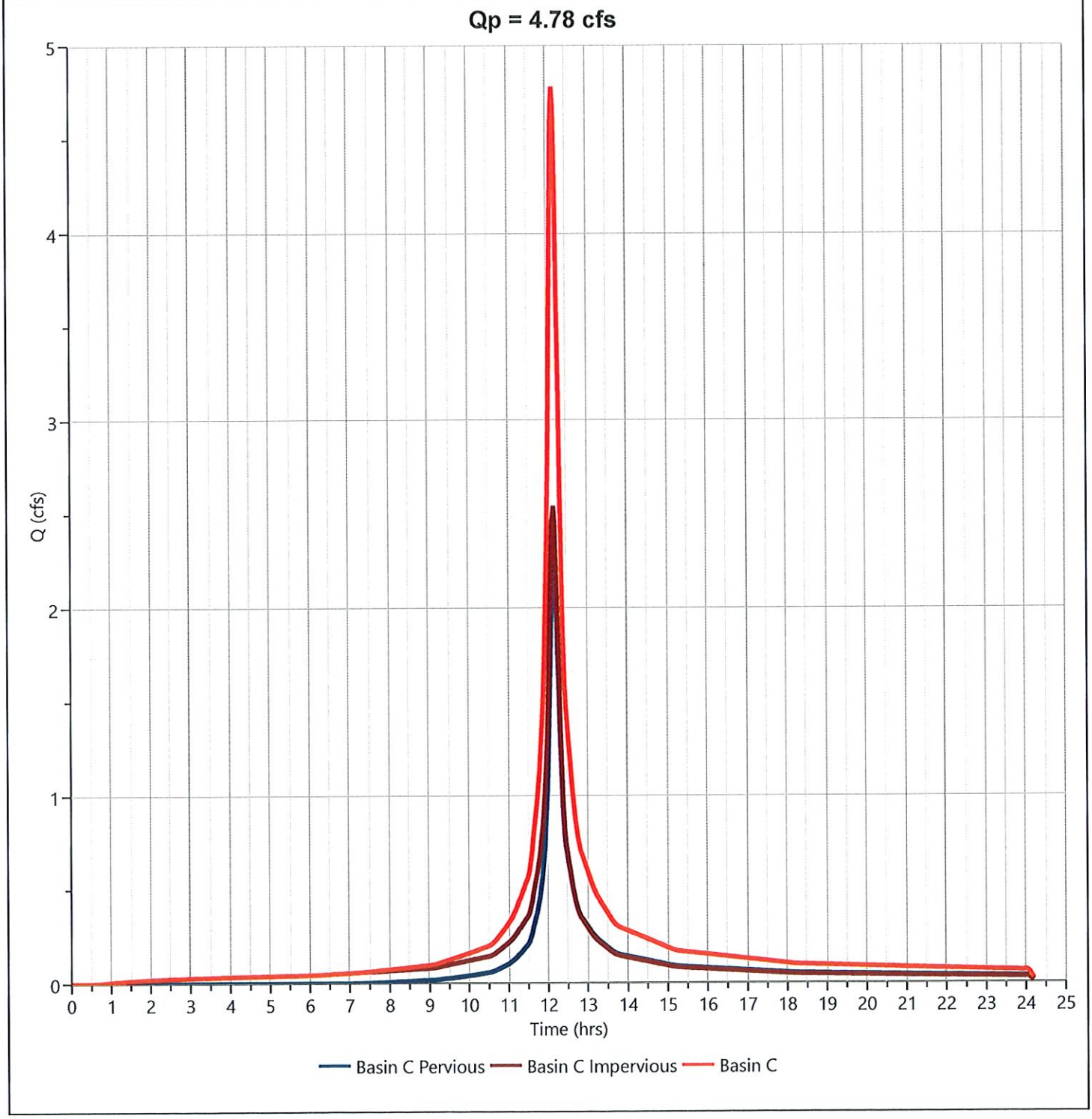
Hydrology Studio v 3.0.0.27

10-16-2023

Post Basin C

Hyd. No. 20

Hydrograph Type	= Junction	Peak Flow	= 4.779 cfs
Storm Frequency	= 100-yr	Time to Peak	= 12.17 hrs
Time Interval	= 2 min	Hydrograph Volume	= 18,159 cuft
Inflow Hydrographs	= 18, 19	Total Contrib. Area	= 0.9 ac



APPENDIX B

PIPE CHART

Storm Sewer Tabulation

Project Name: AN-153 Pipe Design

10-16-2023

Stormwater Studio 2023 v 3.0.0.31

Line ID	Length	Drng Area		Rational	C x A		Tc		Intensity	Total Q	Capacity	Velocity	Line		Invert Elev		HGL Elev		Surface Elev		Line No
		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Up	Dn	Up	Dn	Up	Dn	
	(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Pipe 1	78.00	0.000	0.000	0.00	0.00	0.00	5.0	5.00	9.63	10.00	10.34	8.23	15	2.56	606.00	604.00	607.19	605.25	608.60	604.00	1
Pipe 2	21.00	0.580	0.580	0.90	0.52	0.52	5.0	5.00	9.63	5.03	7.05	4.30	15	1.19	604.25	604.00	605.32	605.25	608.60	604.00	2
Pipe 3	16.00	0.740	0.740	0.86	0.64	0.64	5.0	5.00	9.63	6.13	7.22	5.08	15	1.25	604.20	604.00	605.36	605.25	609.50	604.00	3

Notes: IDF File = SUSSEX IDF.idf, Return Period = 25-yrs.

Project File: PIPEMODEL.sws

Composite C Worksheet

Project Name: AN-153 Pipe Design

10-16-2023

Stormwater Studio 2023 v 3.0.0.31

Line No	Description	Drainage Area (ac)	Runoff Coeff (C)	C x A	Composite (C)	Structure ID
2	Pavement	0.580	0.90	0.522		CB 1
	Totals	**0.580**		**0.522**	**0.90**	
3	Lawn	0.050	0.30	0.015		CB 2
	Pavement	0.690	0.90	0.621		
	Totals	**0.740**		**0.636**	**0.86**	

APPENDIX C

OPERATION AND MAINTENANCE MANUAL

Owner's
Operation and Maintenance Manual
For Drainage System On
Tax Lot 4.01, Block 108
Andover Township,
Sussex County, N.J.

DATED: October 17, 2023

PREPARED BY:
DYKSTRA ASSOCIATES, PC
11 LAWRENCE ROAD
NEWTON, NEW JERSEY 07860
PHONE: 973-579-2177

Table of Contents

Tax Lot 4.01, Block 108

Owner: Seegull, LLC
1023 Limecrest Road, Lafayette, NJ 07848
(973) 383-4651

Introduction:

The drainage system on the above referenced property includes catch basins, storm sewer pipes and two infiltration basins which collect storm water run off from the developed portions of the property. Because ongoing operation of the drainage system is critical in meeting the Township Stormwater Ordinance to provide groundwater recharge, stormwater control and stormwater water quality, it is important that the drainage system be regularly inspected and maintained.

Maintenance Responsibility:

The drainage facilities maintenance will be the sole responsibility of the owner of Tax Lot 4.01, Block 108. Upon any change in ownership, a copy of this Operations and Maintenance Manual shall be provided to the new owner.

Summary of Equipment and Tools

The following equipment and tools will be typically required to perform the subsequent maintenance procedures:

- Hand tools such as shovel, bucket, rake.
- Dump truck to haul away the sediment/debris

Preventative Maintenance:

Preventative maintenance will be performed on a regular basis, and is intended to keep the facility operational at all times. Preventative Maintenance includes the following procedures:

1. Lawn Maintenance. Vegetated areas in and around the parking areas shall be mown at least twice per month during the growing season. Lawn areas on site shall be inspected for puddling after significant storm events to insure that there is positive drainage to the catch basins on site.

2. Catch Basin and Storm Sewer Cleaning. The catch basins and storm sewers shall be cleared of all debris twice annually. Additional cleaning will be performed if necessary to minimize debris from clogging the catch basins and storm sewers. **Do not enter catch basins and/or storm sewers unless properly trained, equipped and qualified to enter a confined space as identified by Occupational Safety and Health Regulations.**

3. Infiltration Basin Maintenance: Immediately following any significant rainfall event, and at least once every six months, all trash and debris shall be removed from the storm sewer immediately upstream of the infitration basin. It is critical that all leaves and debris be removed from the structure in order not to clog the system. Disposal of debris is to be in compliance with all applicable local, state and federal waste regulations. A properly functioning infiltration basin will be dry within 72 hours of the end of a rain event. If the basin does not completely dry within 72 hours, corrective measures must be taken. All use of ferilizers, mechanical treatments, pesticides and other means to assure optimum vegetation health must not compromise the intended purpose of the infiltration basin. All vegetative deficiencies should be addressed without the use of fertilizer and pesticides whenever possible.

Corrective Maintenance:

Corrective maintenance should be provided as soon as practicable after a situation that requires attention is noted or reported. Corrective maintenance includes repair of damage caused by any problems that jeopardize the safety or operation of the draiange system.

Records:

Attached to this report is the Maintenance and Inspection Checklists for use by the property owner. These should be utilized every time maintenance or inspection is performed at the facility. The reports should be appropriately filed, and used to determine the effectiveness of the existing maintenance and inspection schedules, and also used as a guide to revising the schedules as necessary to effectively maintain the operational integrity of the facility.

Inspection and Maintenance Schedule:

An inspection of the facility should be made a minimum of every three months and after every rainfall event in excess of one inch in order to determine the effectiveness of the maintenance work and the condition of the facility. Inspection for erosion and scour shall be performed annually.

The following is the proposed annual inspection schedule:

April

- Inspect all structures and remove debris as necessary from catch basins and outlet structures.
- Inspect berm around infiltration basin. Fill all holes and/or sink holes, which may impact the system.

October

- Inspect all structures and remove debris as necessary from catch basins and outlet structures.
- Inspect berm around infiltration basin. Fill all holes and/or sink holes, which may impact the system.

Approved Disposal and Recycling Sites:

All disposal of sedement and materials removed from the site shall be recycled or disposed of at a licenced facility that accepts refuse. The following is an approved disposal and recycling site: Sussex County MUA, Lafayette, NJ.

Maintenance Checklist

For SEEGULL, LLC

Date of Inspection: _____

A: Preventative Maintenance:

Work Item	Items Required	Items Done	Comments and Special Conditions
1. Trash and Debris Removal	_____	_____	_____
A. Pipes	_____	_____	_____
B. Catch Basins	_____	_____	_____
C. Infiltration Basin	_____	_____	_____
2. Sediment Removal			
A. Pipes	_____	_____	_____
B. Catch Basins	_____	_____	_____
C. Infiltration Basin	_____	_____	_____

B: Corrective Maintenance

1. General Maintenance			
A. Elimination holes	_____	_____	_____
B. Elimination Sink Holes	_____	_____	_____
2. Removal of Debris & Sediment	_____	_____	_____
3. Structural Repairs	_____	_____	_____
4. Engineer Recommended Maint.	_____	_____	_____

Inspection Report
For SEEGULL, LLC

Date of Inspection: _____

Inspection Item	Item Inspected	Comments and Special Conditions
1. Pipes	_____	_____
2. Catch Basins	_____	_____
3. Infiltration Basin	_____	_____
4. Lawn Areas	_____	_____

NOTES:

_____

_____

_____

_____

_____

_____

_____

_____

APPENDIX D

INFILTRATION BASIN ANALYSIS

The proposed Infiltration Basin has been designed in accordance with the BMP Manual as follows:

Soil Data:

Soil Log D1:

0"-20"	Fill
20"-60"	Sandy Clay Loam, 10% Gravel, 10% Cobble, 5% Stone
60"-102"	Fractured Rock
Seepage Depth	N/A
Percolation Rate (60" Depth)	5 Min/Inch

Soil Log D2:

0"-96"	Fill
96"-144"	Sandy Loam, 10% Gravel, 5% Cobble
Seepage Depth	N/A
Percolation Rate (140" Depth)	5 Min/Inch

Infiltration Rate:

The percolation rate of 5.0 minutes per inch converts to a permeability rate of 12.0 inch/hour. As required by Best Management Practices, the infiltration rate was divided by two to yield a design infiltration rate of 6.0 inch/hour. The design infiltration rate was used for all calculations.

Intiltration Basin Depths:

Soil Log Elevation	Seepage Depth	Ground Water Elevation
609.75 ft	N/A	N/A

Bottom Elevation of Basin:	604.00 ft
Bottom Elevation of Sand Layer:	603.50 ft
Max. Elevation of Ground Water:	601.25 ft

Because the groundwater table was not encountered anywhere on site, it was assumed to be present at the termination of soil log D1. The bottom of the sand layer is 2.25 feet above the groundwater elevation and exceeds the 2 foot minumim separation requirement.

Evacuation Analysis:

As demonstrated by the attached hydrograph, the following is the evacuation time for the 1.25" water quality storm event for the infiltration basin proposed on site:

Evacuation Analysis:
Time to Peak: 1.17 Hours
Basin Empty: 7.43 Hours
Time to Evacuate: 6.26 Hours

Therefore, the infiltration basin will be empty within the requisite 72 Hour period.

TSS Removal Rate:

Water Quality Requirements do not apply to this project as the proposed development does not result in an increase of one-quarter acre or more of regulated motor vehicle surface.

Mounding Analysis:

A mounding analysis is attached utilizing the Model provided by the USGS report 2010-5102. The results of this analysis are as follows:

Bottom of Basin: 604.00'
Ground Water Elevation below Basin: 601.25'
Depth of Mound Per Model: 1.10'
Maximum Elevation of Mound: 602.35'

Therefore, the maximum elevation of the mound is 1.65 feet below the bottom of the basin. The completed spreadsheets are attached.

Hydrograph Report

Project Name: AN-153

Hydrology Studio v 3.0.0.27

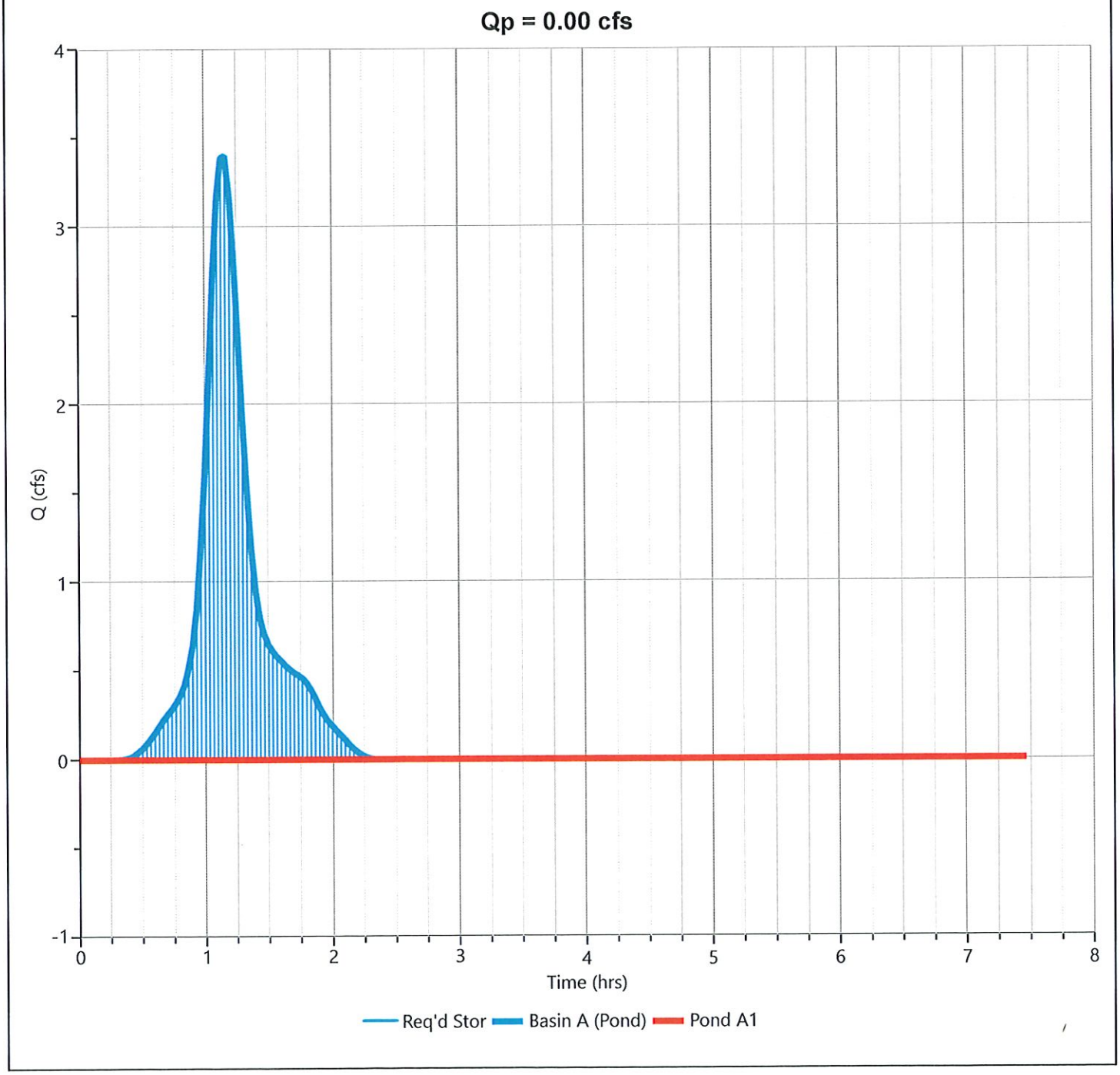
10-16-2023

Pond A1 (WQDS)

Hyd. No. 13

Hydrograph Type	= Pond Route	Peak Flow	= 0.000 cfs
Storm Frequency	= 2-yr	Time to Peak	= 446 min
Time Interval	= 2 min	Hydrograph Volume	= 0.000 cuft
Inflow Hydrograph	= 12 - Basin A (Pond)	Max. Elevation	= 606.50 ft
Pond Name	= Pond A	Max. Storage	= 4,202 cuft

Pond Routing by Storage Indication Method



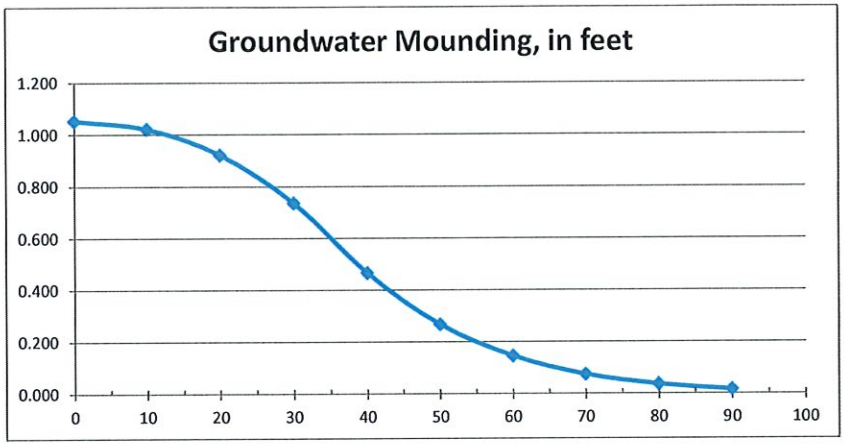
Input Values

0.15	R	Recharge rate (permeability rate) (in/hr)
		Specific yield, Sy (dimensionless)
0.150	Sy	default value is 0.15; max value is 0.2 provided that a lab test data is submitted
		Horizontal hydraulic conductivity (in/hr)
6.00	Kh	Kh = 5xRecharge Rate (R) in the costal plan; Kh=R outside the coastal plan
35.000	x	1/2 length of basin (x direction, in feet)
35.000	y	1/2 width of basin (y direction, in feet)
16.50	t	Duration of infiltration period (hours)
10.00	hi(0)	Initial thickness of saturated zone (feet)

11.054	h(max)	Maximum thickness of saturated zone (beneath center of basin at end of infiltration period)
1.054	Δh(max)	Maximum groundwater mounding (beneath center of basin at end of infiltration period)

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
1.054	0
1.022	10
0.923	20
0.737	30
0.467	40
0.269	50
0.146	60
0.075	70
0.037	80
0.017	90

Re-Calculate Now



Disclaimer

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.